

# **KENTUCKY**

## **CHILD FATALITY REVIEW SYSTEM**

### **2001 Annual Child Fatality Review Report**



**CABINET FOR HEALTH SERVICES  
DEPARTMENT FOR PUBLIC HEALTH  
&  
KENTUCKY CHILD FATALITY REVIEW STATE TEAM**

**December 2003**

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**MESSAGE FROM THE COMMISSIONER**  
**Cabinet for Health Services**  
**Department for Public Health**

This report summarizes child fatality causes in Kentucky for children under the age of 18 and stresses related risk factors and prevention measures. The report information is based on Kentucky 2001 vital statistics and coroner child fatality report data.

It is very encouraging that the 2001 data reflects that the Kentucky infant mortality rate (5.9) is below that of the national rate (6.9). During recent years many dedicated health care providers have steadfastly promoted and practiced initiatives to provide better access to prenatal care, reduce drug, alcohol and tobacco use, increase folic acid use, and have encouraged proper nutrition and physical exercise in women of child bearing age. We are very grateful for these efforts that are contributing to improvement for Kentucky mothers and their babies. Yet, we must continue with these and other prevention measures as we strive to achieve a standard of excellence regarding infant health and survivability.

Of concern is the fact that transportation related injuries continue to be the predominant cause of Kentucky child deaths between one through 17 years of age. It is imperative that we recognize these injuries as priority public health life threats to children, and couple public awareness and prevention education activities with appropriate supporting primary enforcement legislation.

The September 11, 2001 terrorism attack initiated a strong influence on public health to pre-eminently focus on preventive measures regarding weapons of mass destruction, including chemical and biological warfare. However, the Kentucky Department for Public Health shall continue to implement child safety systems aimed at reducing preventable child deaths, while providing leadership in community based safety preparedness for all Kentucky citizens. All individuals and communities are encouraged to diligently practice injury prevention methods proven to make a significant difference in reducing child injury and fatality. Kentucky children's future depends on assuring a safe and quality community life for them and their families.

**Sincerely,**

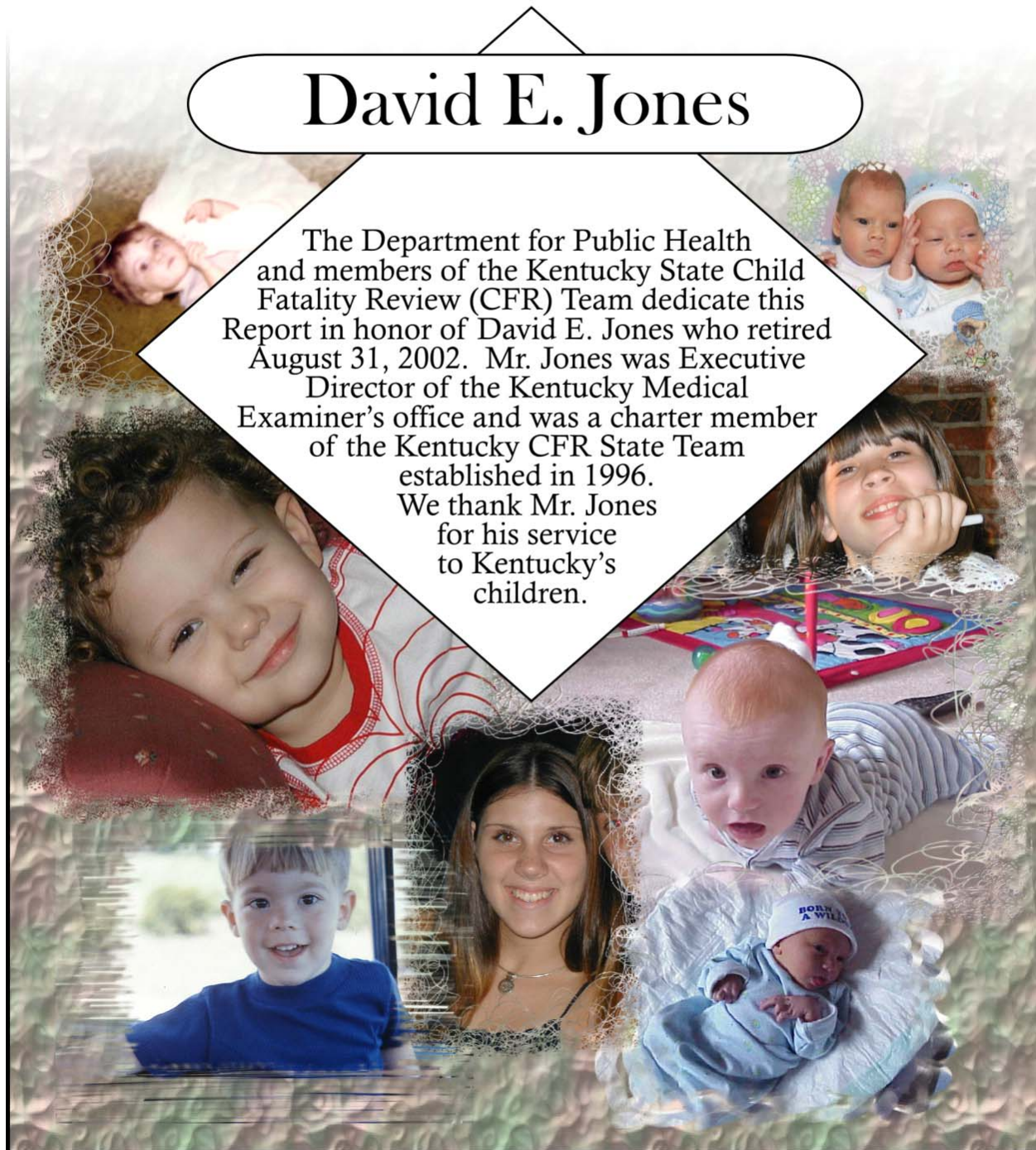
**Rice C. Leach, MD**  
**Commissioner**  
**Department for Public Health**



# DEDICATION

## David E. Jones

The Department for Public Health and members of the Kentucky State Child Fatality Review (CFR) Team dedicate this Report in honor of David E. Jones who retired August 31, 2002. Mr. Jones was Executive Director of the Kentucky Medical Examiner's office and was a charter member of the Kentucky CFR State Team established in 1996. We thank Mr. Jones for his service to Kentucky's children.



# ACKNOWLEDGEMENTS

The development of the 2001 Kentucky Child Fatality Review (CFR) Annual Report was completed by the Department for Public Health staff and the CFR state team members. The Department for Public Health is indeed grateful for the time and effort contributed toward this annual CFR report by all individuals involved.

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We would also like to thank Mark Jewell for the design and development of the front cover of this report and the dedication page.

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## **Executive Summary**

Deaths to children less than 18 years of age are steadily declining in the Commonwealth. In 1997, there were a total of 715 child deaths to Kentucky residents compared to 606 child deaths in 2001. This represents a decline of 15% over the five year period. The majority of child deaths (65%) were due to Natural causes whereas 35% were Injury related causes.

The most common cause of infant mortality was perinatal period conditions followed by congenital anomalies. The most common cause of death to Kentucky's teen population (ages 13-17) was motor vehicle fatalities followed by suicide.

The most common Natural cause child fatality was certain conditions originating in the perinatal period followed by congenital anomalies. The most common Injury related fatality was transportation related fatalities followed by accidental suffocation/strangulation.

Overall, the rate of death was higher among males compared to females (7.1/10,000 vs. 5.0/10,000) with males having a higher rate of Natural cause deaths than Injury related causes (4.3/10,000 vs. 2.7/10,000). Similarly, females had a higher rate of Natural cause deaths than Injury related causes (3.6/10,000 vs. 1.5/10,000).

In terms of age, infants (<1 year of age) had a higher rate of death than any other age group. The rate of death to infants due to Natural causes was almost 10 times that of the rate of death due to Injury related causes (54.2/10,000 vs. 5.5/10,000 respectively). In contrast, deaths to children aged 10-17 were primarily Injury related causes with this age group having a rate of death due to Injuries 2.6 times that of Natural causes (2.6/10,000 vs. 1.0/10,000 respectively).

The following table presents an overview of the comparison of Natural cause child fatalities to Injury cause child fatalities in the Commonwealth of Kentucky for year 2001.

## Comparison of Natural Cause Child Fatalities to Injury Cause Child Fatalities for Year 2001

	Grand Total		Natural Cause		Injury Cause	
	#	Rate*	#	Rate*	#	Rate*
<b>Total</b>	606	6.1	395	4.0	211	2.1
<b>Male</b>	363	7.1	221	4.3	140	2.7
<b>Female</b>	243	5.0	174	3.6	71	1.5
<b>Age Groups:</b>						
<b>&lt;1</b>	318	59.8	288	54.2	29	5.5
<b>1-4</b>	74	3.5	38	1.8	36	1.7
<b>5-9</b>	55	2.0	24	0.9	31	1.1
<b>10-17</b>	159	3.5	45	1.0	115	2.6

\*Rates are per 10,000 specified population ; Denominator data are based on the U.S. Census Bureau's 2000 census population estimates for Kentucky.  
 Note: Classification of death (Natural vs. Injury) is based on the ICD10 code as recorded on the death certificate



## **Child Fatality Review in Kentucky**

In 1978, a California child psychiatrist, frustrated over disorganized responses to unexpected infant and child death, initiated the development of a multidisciplinary team to review child abuse and neglect. In 1992, Missouri was the first state to develop an organized integrated approach to child fatality review. Following the lead of this new successful approach, Child Fatality Review (CFR) legislation was enacted in Kentucky in 1996 under KRS 211.684. Requirements for the CFR process and the state and local CFR teams were established.

The state team is charged with reviewing selected child death cases and advising the Kentucky Department for Public Health (DPH) in strategies to address child death high risk factors, child injury prevention and infrastructure building to assure a strong child fatality and injury review system throughout Kentucky.

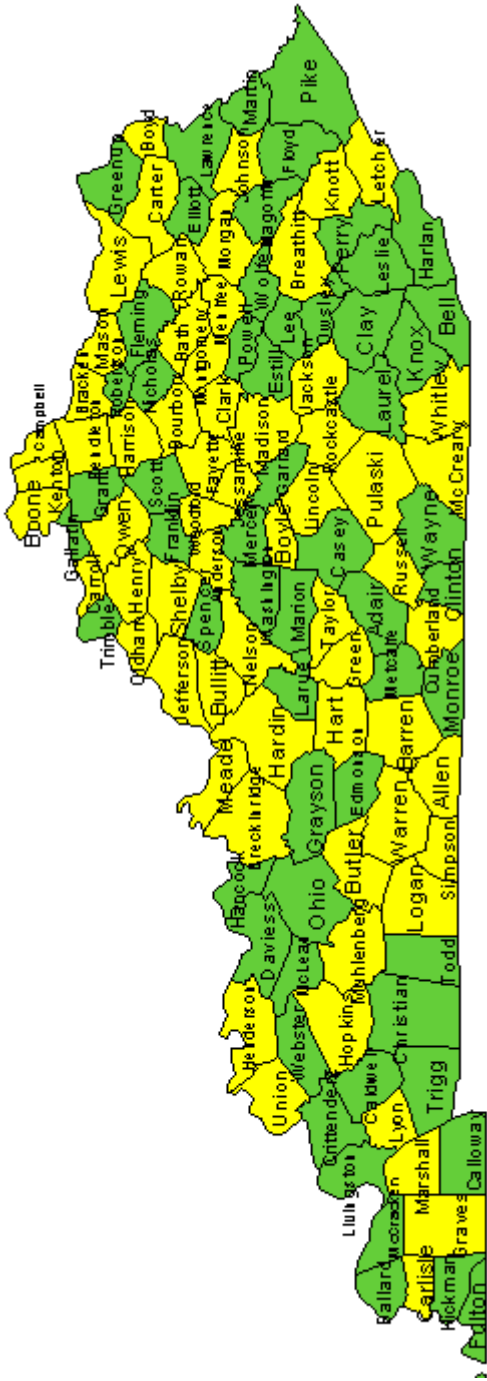
Through ongoing collaboration with county coroners and local health departments, the DPH receives reports of all Kentucky child deaths that are classified as coroner cases. These data are used in the Department's annual CFR report publication. In addition to addressing trends in child deaths, the DPH promotes grief counseling through local health departments to any resident family who has lost a child in death and assures grief counseling skills through continuing education.

The DPH provides technical assistance to local coroners and interested community representatives on how to develop, maintain and evaluate county-level child fatality review teams. Additionally, the DPH helps assure quality improvement of local child fatality review through systems evaluation and on-site assessment of local health department knowledge of best practice for child fatality review.

In the summer of 2002, 86% of all Kentucky coroners responded to a DPH statewide survey to assess the needs of county child review teams. The survey revealed that 63 or 52% of the 120 Kentucky counties have local CFR teams (see map on page 2). This was a 25% increase in local county teams since 1999. Twenty-four (24) coroners that reported not having a local CFR team expressed an interest in developing a team. Eighty-four percent (84%) of those having a CFR team indicate that child deaths are reviewed timely within days to 2 weeks.

The Kentucky DPH is committed to providing continued leadership in education, training and child fatality review to increase awareness among health professionals and the general public that injury related deaths among children and adolescents are mostly preventable.

## KY Counties having local Child Fatality Review Teams (Shown in Light Gray)



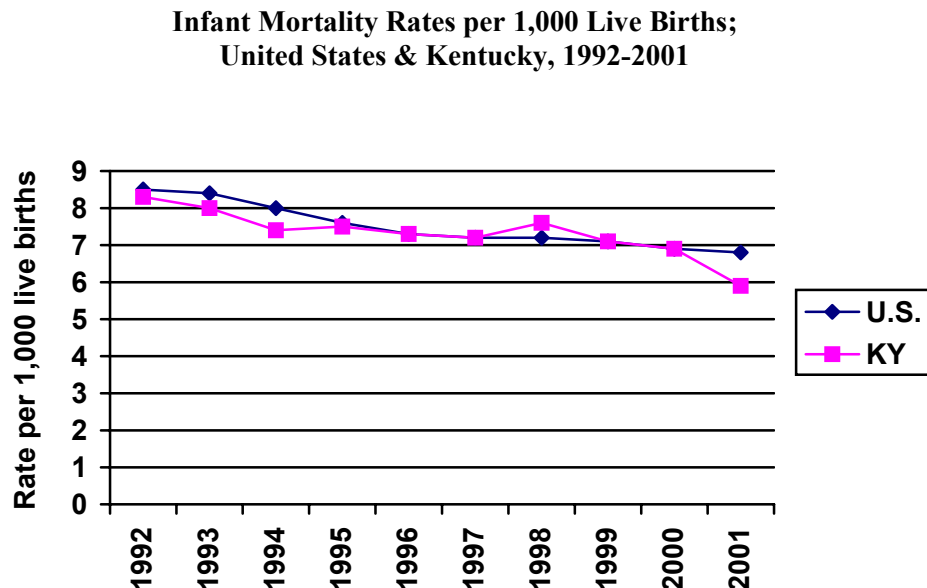
## 2002 Coroners' Survey Results

## Infant Mortality

Infant mortality rates are the most commonly used index for measuring the risk of dying during the first year of life. Infant mortality is expressed as a rate of death per 1,000 live births. Often times, infant mortality rates are used to assess the health status of a nation or a specific geographical area. Multiple factors affect infant mortality making it difficult to target interventions however, significant advances have been made in the field of science which has helped to reduce infant deaths. Even though improvements are being made, the U.S. still has one of the higher infant mortality rates of all industrialized nations.

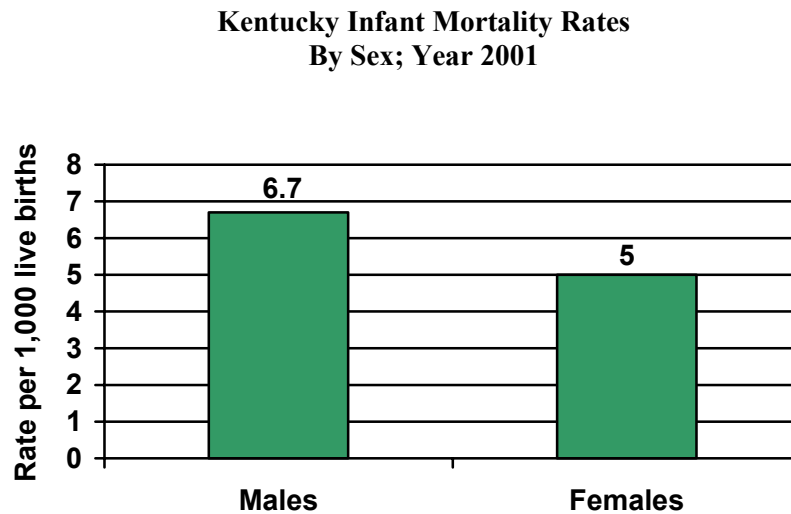
Infant mortality has been steadily decreasing in Kentucky and the U.S. over time. From 1992-2001 the infant mortality rate declined 21% for the U.S. and 28% for Kentucky (Figure 15.). The 2001 infant mortality rate for Kentucky was 5.9/1,000 live births, the lowest rate ever recorded for Kentucky.

Figure 15.



The rate of infant deaths was higher among males as opposed to females with males having a rate of death 1.3 times that of females (Figure 16.). Males in general are typically at greater risk of dying during the first year of life as opposed to females and even though infant deaths are decreasing as a whole, male deaths are still higher than female deaths.

Figure 16.



Infant mortality rates differ greatly among whites and non-white races. Black infants have higher rates of mortality compared to white infants. In fact, over the last ten years in Kentucky, the infant mortality rate has not decreased for blacks in the same way it has for whites. In 2001, the ratio of the black to white infant mortality rate was 1.9, meaning that black infants were almost twice as likely to die during the first year of life compared to white infants (Table 1.). This discrepancy has not improved over the last five years and actually increased from 1.5 in 1997 to 1.9 in 2001.

Table 1.

Kentucky Infant Mortality Rates* By Race; 1992-2001		
Year	White	Black
1992	7.8	12.6
1993	7.4	14.1
1994	6.8	13.5
1995	7.2	10.7
1996	6.8	13.0
1997	7.0	10.8
1998	6.9	15.4
1999	6.7	12.3
2000	6.3	12.9
2001	5.4	10.5

\*Rates are per 1,000 live births

## Natural Cause Child Fatalities

Natural cause deaths can be influenced by a wide variety of factors. In terms of natural cause deaths in children, contributing factors may be present before conception and throughout the pregnancy. Such factors may include but are not limited to socio-economic factors, cultural factors, geographical location, education level, and health behaviors of the mother. Poor birth outcomes are greatest among teenage mothers, those of non-white race, and individuals living in poverty. Steps taken to improve pregnancy outcomes include early and appropriate prenatal care, health education, proper nutrition, social support, risk identification with intervention, and obstetrical care. Prior to conception and throughout the prenatal period, it is critical that efforts are made to make all pregnancies as healthy as possible since this will directly impact the number of infant and child deaths in the state.

Child deaths due to natural causes account for the larger proportion of fatalities for the year 2001 (Figure 1). Deaths classified under the category of natural cause are generally linked to a specific disease or condition such as cancer or congenital anomalies. Natural cause deaths to children are slowly declining as depicted in Figure 2. There was a 15% decrease in the number of natural cause deaths to children from 1997-2001. Several factors have contributed to this decrease over time, such as improved access to care, medical technology advances, and targeted interventions toward known risk factors. As the field of Science and Medicine advances, it is hopeful that the numbers will continue to decline throughout the future.

Figure 1.

Percent of Total Kentucky Child  
Deaths by Type; Year 2001

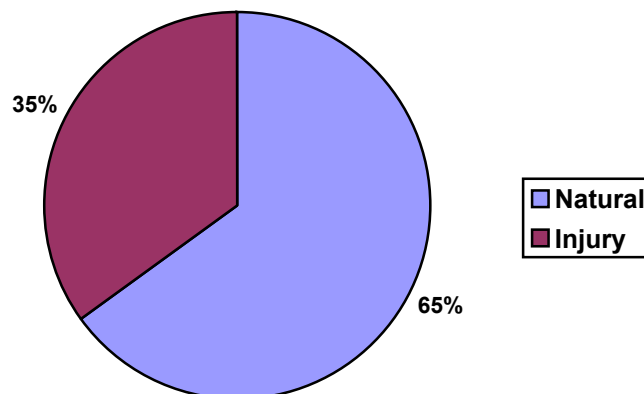
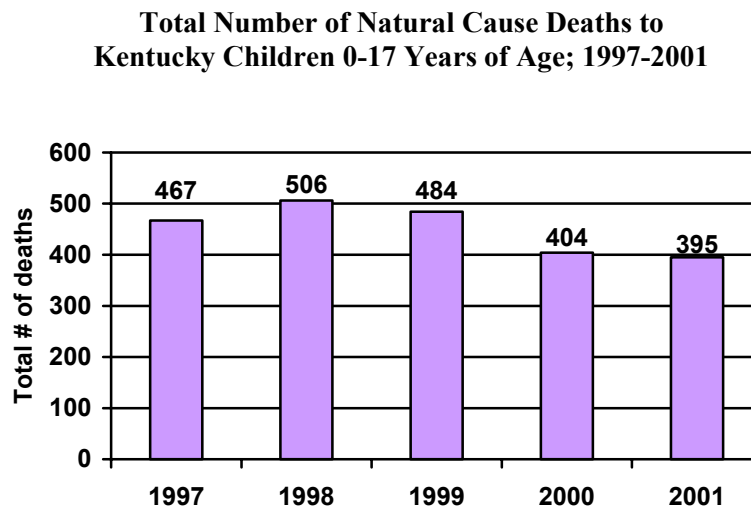


Figure 2.



Over half (73%) of the natural cause deaths occurred to children less than one year of age with only 27% occurring to those aged 1-17 (Figure 3.). Further age break-outs reveal that infants (<1 year of age) have the highest age-specific death rate due to natural causes with a rate of 54.2/10,000 population (Figure 4.).

Figure 3.

**Percent of Kentucky Natural Cause  
Child Deaths by Age Groups; Year 2001**

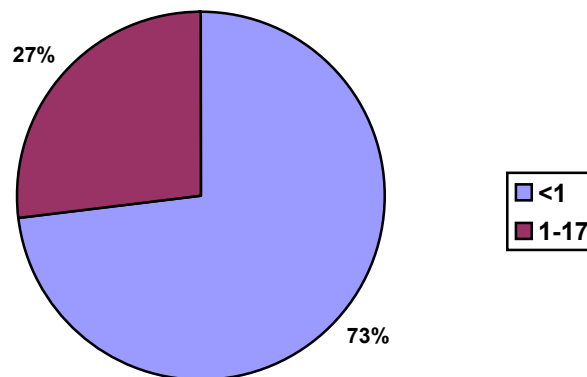
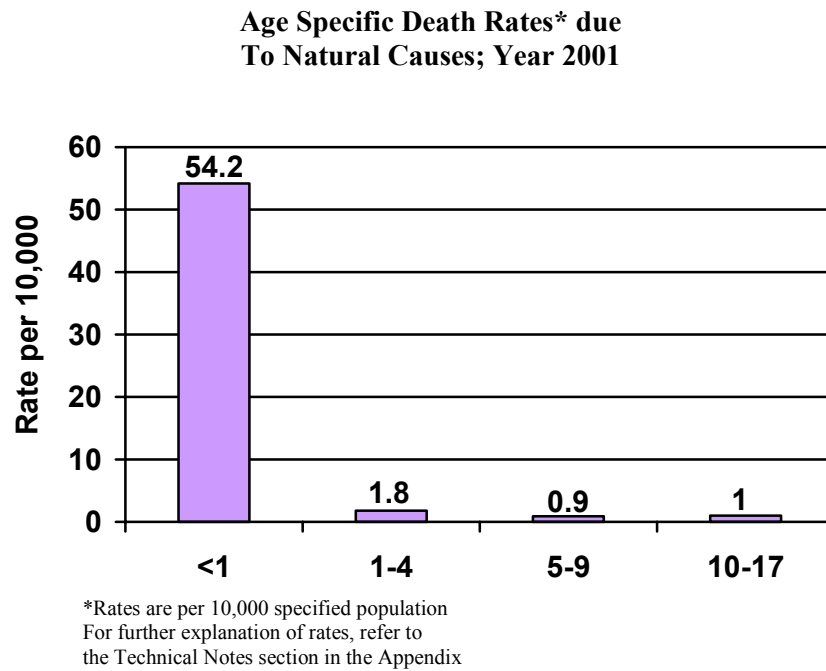


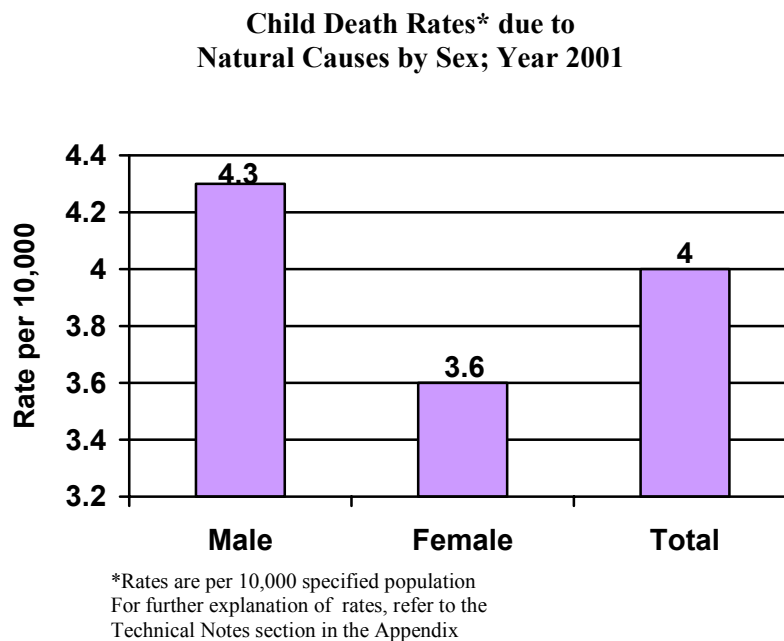


Figure 4.



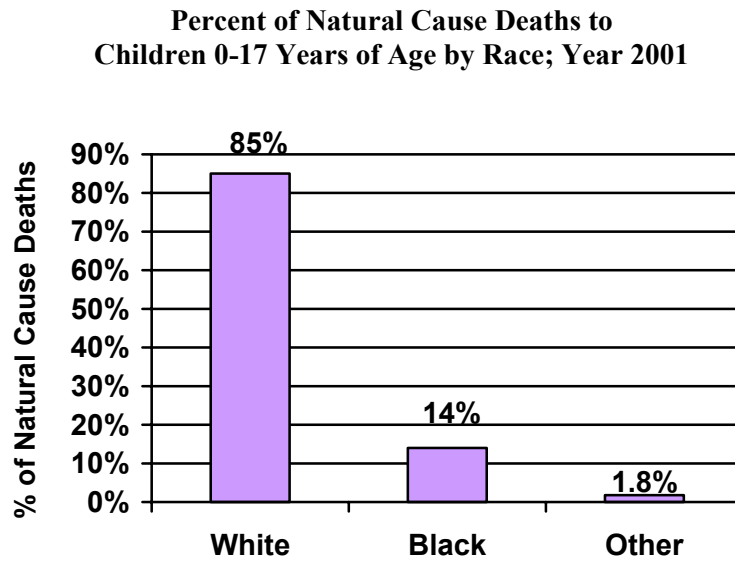
Natural cause deaths affect males at a higher rate than females (Figure 5.) with males having a rate 1.2 times higher than that of females. The overall rate of deaths due to natural causes for year 2001 was 4.0/10,000 population aged 0-17.

Figure 5.



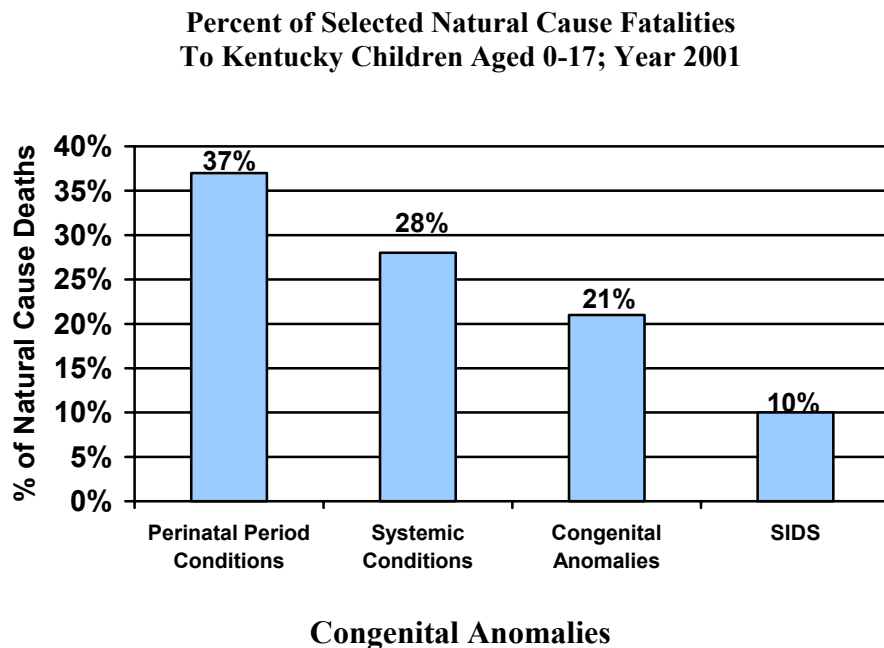
The percentage of natural cause deaths was highest among those of white race compared to those of black or other races (Figure 6.). Over three-fourths (85%) of the deaths in this category were to those children of white race.

**Figure 6.**



The perinatal period (defined as 20 weeks gestation through 27 days of life) is a vulnerable time for both the developing fetus and the newborn. In Kentucky, the greatest number of natural cause deaths were due to adverse conditions originating in the perinatal period (Figure 7.). Some examples of this category include: complications of pregnancy, labor and delivery, disorders related to length of gestation and fetal growth, birth trauma, and infections specific to the perinatal period. Systemic conditions and diseases were the second most common natural cause death occurring to children. Examples of this category include infectious diseases, endocrine and metabolic diseases, nervous system diseases, digestive system diseases, musculoskeletal system diseases, and genitourinary system diseases.

**Figure 7.**

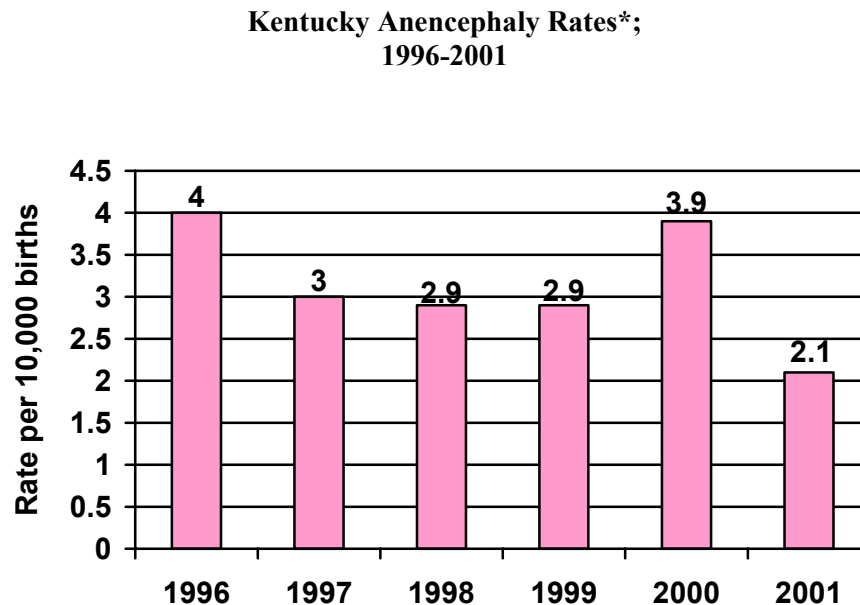


Congenital anomalies, also known as birth defects, accounted for 21% of the natural cause deaths in 2001. Birth defects continue to remain the leading cause of morbidity and mortality in the U.S. accounting for more than one in five infant deaths. Even though advances in other causes of infant mortality have lead to their decline, there has not been a significant decline in those infant deaths due to birth defects over the past several years.

One specific type of congenital anomaly, neural tube defects (NTDs), affect approximately 4,000 infants each year in the U.S. NTDs are a group of congenital malformations involving defects in the skull and spinal column that are caused primarily by the failure of the neural tube to close during embryonic development. This group of defects consist of anencephaly, spina bifida, and encephalocele.

Anencephaly, a lethal condition characterized by the absence of major portions of the brain and malformation of the brainstem, accounts for several of the infant deaths due to congenital anomalies. In Kentucky, rates of anencephaly declined 46% from 1996-2001 with the highest rate (4.0/10,000 births) occurring in 1996 (Figure 8.).

Figure 8.



\*Rates are per 10,000 live and still births  
Cases are based on the ICD9 code 740.0-740.1  
Source: Kentucky Births Surveillance Registry, 1996-2001

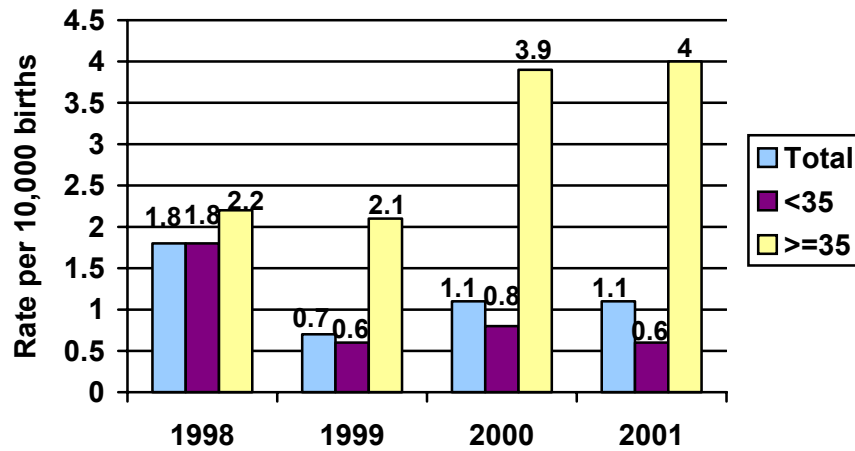
Certain other types of birth defects are considered to be lethal conditions thus contributing greatly to the overall infant mortality rate. Two such types of conditions are Trisomy 13 and Trisomy 18. These two types of syndromes are the second and third most common chromosomal abnormalities with Down Syndrome being the most common.

Trisomy 13 is a chromosome disorder in which a child has an extra copy of chromosome 13. There is no known apparent cause for the disorder, however advanced maternal age seems to play a role. Nationally, the disorder affects approximately 1/5,000 live births and is a common chromosomal cause of fetal death, miscarriage, and stillbirth<sup>1</sup>. Infants born with Trisomy 13 tend to be small for gestational age and have anatomical defects of the brain. Approximately 80% of cases have additional congenital anomalies including heart defects, cleft lip and or cleft palate, omphalocele, and limb anomalies. Infants that survive past one month of age usually have severe developmental delays as well as slow physical growth<sup>2</sup>.

Rates of Trisomy 13 decreased 35% in Kentucky from 1998-2001. There was also a 65% decrease in the rate of Trisomy 13 to women less than 35 years of age at the time of birth for the same time period. Although overall rates and rates to women less than 35 decreased, the rate of Trisomy 13 to women aged greater than or equal to 35 at the time of birth increased from 2.2/10,000 births in 1998 to 4.0/10,000 births in 2001 (Figure 9.). This represents an increase of 84% during the four year time frame.

**Figure 9.**

**Rates\* of Trisomy 13 by Maternal Age\*\* Among  
Kentucky Residents, 1998-2001; Kentucky  
Birth Surveillance Registry Data**



\*Rates are per 10,000 live & still births per specified age group

\*\*Maternal age reflects the Mother's age at time of birth, either <35 or >=35

Cases are based on the ICD9 code 758.1

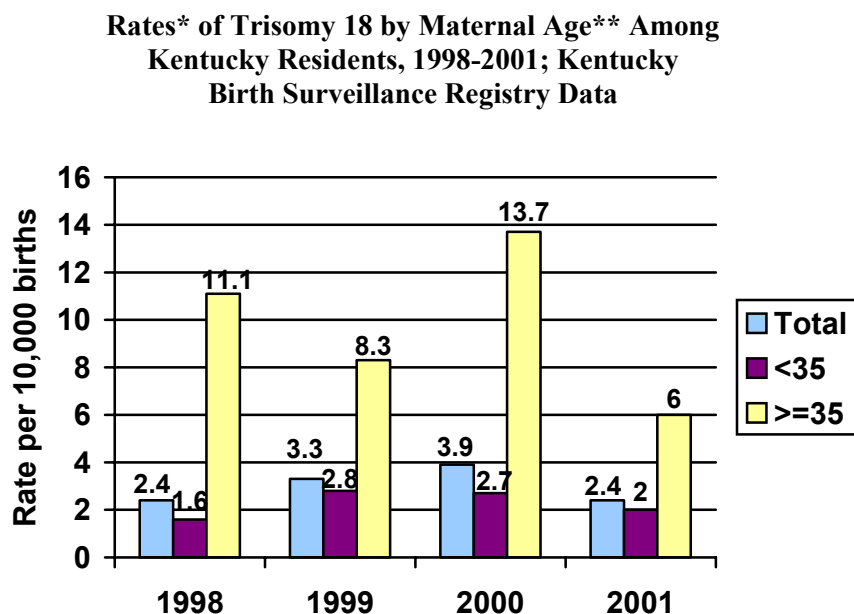
Source: Kentucky Birth Surveillance Registry, 1998-2001

Trisomy 18, the second most common chromosomal disorder after Down syndrome, is a genetic disorder affecting approximately 1/8,000 live births nationally. This syndrome is typically a lethal condition where 95% of affected fetuses abort spontaneously. Babies born with Trisomy 18 have a very poor prognosis with 96% dying within the first year of life, 30% within the first month, and 50% within the second month<sup>3</sup>. There is no known cause for this disorder, however, advanced maternal age appears to be a risk factor. There is often a history of minimal fetal activity, excess fluid in the fetal sac, a small placenta, and a single umbilical artery.

Infants born with Trisomy 18 tend to be small for gestational age, have difficulty eating, and fail to thrive. Often times other congenital anomalies are present such as heart defects, anomalies of the lung, kidney, and diaphragm, cleft lip and or cleft palate, eye abnormalities, hearing loss, and limb deformities. Severe developmental delays and profound mental retardation are exhibited by those infants surviving to one year of age<sup>4</sup>.

Rates of Trisomy 18 in Kentucky have remained essentially unchanged since 1998 with a rate of 2.4/10,000 births in 1998 and 2001. There was a slight increase in rates to women less than 35 years of age at time of birth rising from 1.6 to 2.0/10,000 births from 1998-2001. Rates to women greater than or equal to 35 years of age at time of birth decreased 46% during the four year time period (Figure 10.).

**Figure 10.**



\*Rates are per 10,000 live & still births per specified age group

\*\*Maternal age reflects the Mother's age at time of birth, either  
<35 or >=35

Cases are based on the ICD9 code 758.2

Source: Kentucky Birth Surveillance Registry, 1998-2001



Multiple causes exist for birth defects however, current research is gaining insight into more specific causes enabling prevention efforts to become more targeted. One such example is the discovery that up to 70% of NTDs can be prevented through the daily consumption of 400 mcg of folic acid by women of childbearing age. Proper risk education along with preconceptional health promotion are critical elements of targeted prevention in helping to reduce birth defects. Although all birth defects are not preventable, there are steps that a woman can take to increase her chance of having a healthy baby. Many birth defects happen very early in pregnancy, sometimes before a woman even knows that she is pregnant.

Every woman should:

- Take a multivitamin that has 400 mcg of folic acid in it every day
- Have regular medical check-ups
- Talk to her health care provider about any medical problems such as diabetes or phenylketonuria
- Talk to her health care provider about any medicine use including over-the-counter and prescription medications
- Talk to her health care provider about substances at work or home that should be avoided as they might be harmful to a developing baby
- Keep vaccinations up-to-date
- Eat a healthy, balanced diet
- Avoid eating raw or undercooked meat
- Avoid alcohol, tobacco, and street drugs

Surveillance of birth defects in Kentucky is necessary in order to identify areas of concern within the state. One way in which this is accomplished is through a statewide birth defects registry. The Kentucky Birth Surveillance Registry (KBSR) is a state mandated surveillance system designed to provide information on incidence, prevalence, trends and possible causes of stillbirths, birth defects, and disabling conditions. The KBSR collects information from vital records, acute care, and birthing hospitals, laboratory reporting, and voluntary outpatient reporting on all children from birth to five years of age who are diagnosed with any structural, functional, or biochemical abnormality determined genetically or induced during gestation. The KBSR operates under the authority of KRS 211.651-670 with statewide data collection for surveillance beginning in April of 1996.

## **Sudden Infant Death Syndrome**

Sudden Infant Death Syndrome (SIDS) remains in the top ten leading causes of infant deaths in the U.S. and was the third leading cause of infant deaths in 2001. The American Academy of Pediatrics defines SIDS as “the sudden death of an infant under the age of one year which remains unexplained after thorough case investigation, including the performance of a complete autopsy, examination of the death scene, and review of the clinical history.” The typical presentation in SIDS is the sudden unexpected death of a seemingly healthy infant with more deaths occurring in the winter months. Ninety-five percent of SIDS cases occur by six months of age with peak onset between two and four months.

The etiology of SIDS is still unknown and several risk factors play a key role in the onset of the syndrome. Some of the risk factors include:

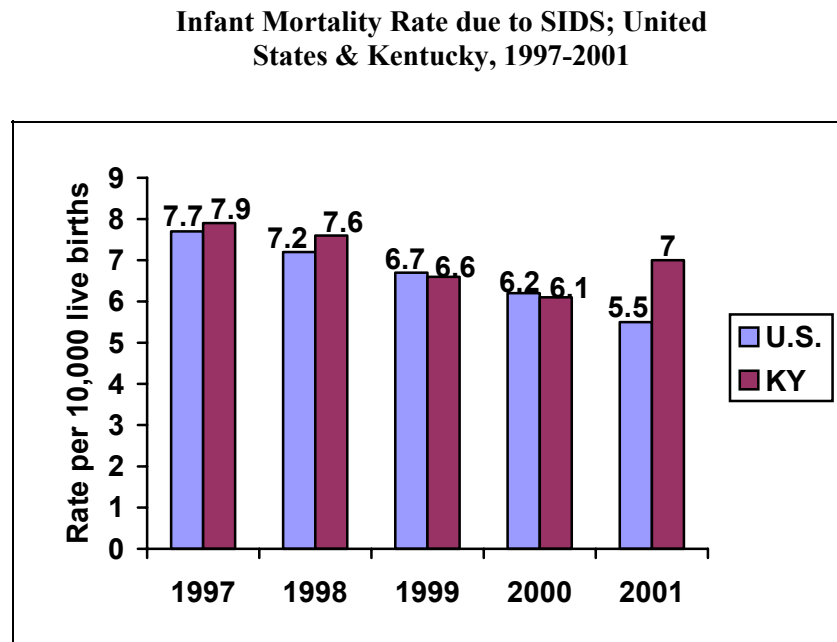
- Maternal smoking during pregnancy
- Infants exposed to passive smoke after birth
- Maternal age younger than 20 years at first pregnancy
- Illicit drug use during pregnancy
- Low socioeconomic status
- Premature infant
- Low birth weight infant
- Inadequate or no prenatal care
- Infants placed to sleep in prone sleeping position
- Infants placed to sleep on soft bedding surfaces
- Infants with a recent history of illness

It is also important to note that SIDS affects a higher percentage of males than females. Also, a large number of infants who die from SIDS have either a respiratory or gastrointestinal infection prior to their death. Research to determine the cause of SIDS is still ongoing. Evidence suggests that some SIDS babies are born with brain abnormalities that make them vulnerable to sudden death during infancy. These abnormalities are found in the part of the brainstem involved in the control of breathing during sleep.

While there is currently no way to determine which infants will die from SIDS, it is imperative that all parents and caregivers of infants are aware of the risk factors for SIDS and take the appropriate measures to lower these risks.

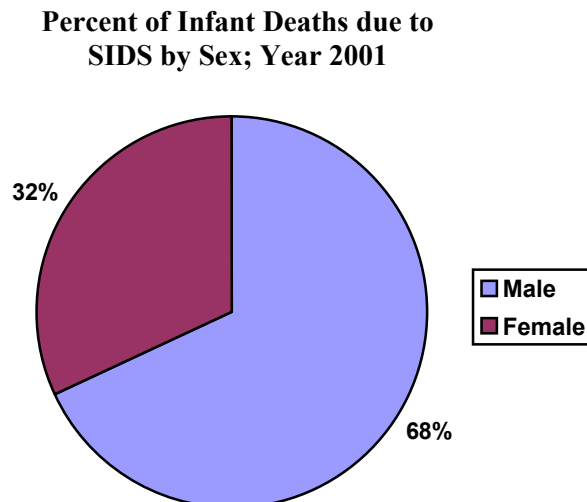
SIDS deaths accounted for 10% of the natural cause child deaths for Kentucky during 2001. Although the infant mortality rate due to SIDS has slightly decreased over the last five years, Kentucky still remains well above the National rate (Figure 11.).

Figure 11.



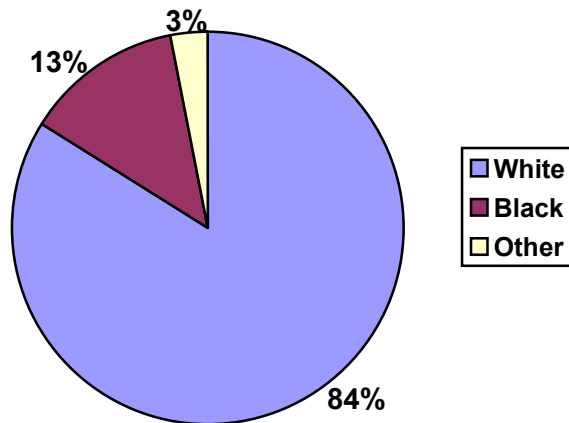
There were a total of 38 Kentucky infant deaths due to SIDS in 2001 with 79% of those occurring in infants between the ages of one and four months. Over half (68%) of SIDS deaths were male compared to female (Figure 12.) and 84% were of white race (Figure 13.).

Figure 12.



**Figure 13.**

**Percent of Infant Deaths due to  
SIDS by Race; Year 2001**



**Prematurity and Low Birth Weight**

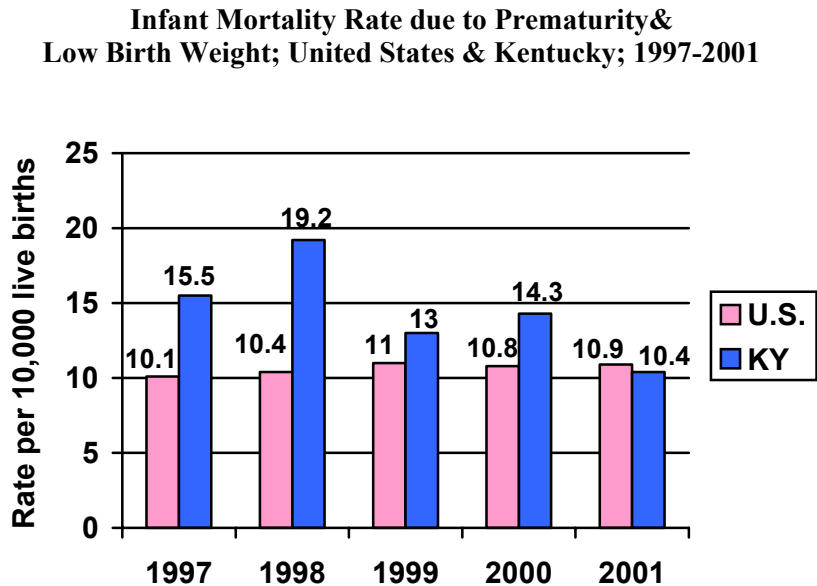
Prematurity and low birth weight fatalities contribute greatly to the natural cause deaths both nationwide and in Kentucky. In fact, in 2001, prematurity and low birth weight was the second leading cause of infant mortality in the U.S. and has remained among the top ten leading causes of infant death for the past five years.

Preterm birth is defined as any birth occurring prior to 38 weeks of completed gestation, and low birth weight is defined as any infant weighing less than 2500 grams (5lb. 8oz.) at birth. Certain known risk factors place a woman at higher risk of preterm delivery than others. These factors include:

- Previous preterm or low birth weight birth
- Multiple births
- Short interpregnancy interval
- Maternal smoking during pregnancy
- Maternal drug use during pregnancy
- Certain infections during pregnancy including sexually transmitted diseases
- Little or no prenatal care
- Certain birth defects

Even though the preterm, low birth weight infant mortality rate has declined 34% in Kentucky over the past five years, the rate continued to remain above the national rate until 2001 where it dropped slightly below (Figure 14.).

Figure 14.



Continued research into the causes and risk factors associated with prematurity and low birth weight is critical in order to develop effective prevention of preterm and low birth weight deliveries. Women must be educated to recognize the signs of preterm labor and know the appropriate steps to follow.

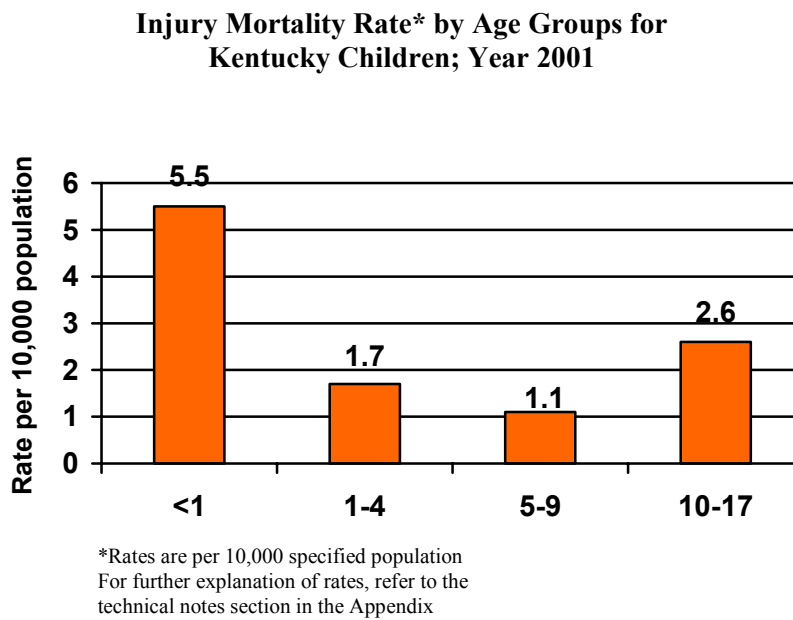
## Injury Related Fatalities

Injuries to children continue to remain a major cause of morbidity and mortality in the U.S. The majority of childhood injuries are preventable yet they continue to remain in the top ten leading causes of death nationwide. Injuries are also extremely costly to society. The financial cost of injuries is estimated at more than \$224 billion each year. These costs include direct medical care, rehabilitation, lost wages and lost productivity. The federal government pays approximately \$12.6 billion each year in injury related medical costs and about \$18.4 billion in death and disability benefits. It is estimated that insurance companies and other private sources pay approximately \$161 billion annually<sup>5</sup>.

Prevention of injuries is necessary in order to reduce the number of injury related deaths. Previous research has identified three key aspects of injury prevention including education, environment/product changes, and legislation/regulation. Of these three areas, legislation/regulation is the most influential in reducing childhood injuries<sup>6</sup>. Injury rates exhibit a decline when education, environmental and product changes are combined with primary enforcement. Kentucky has achieved progress in protecting very young children with primary enforcement regulations regarding appropriate use of safety seats and restraints. Proper restraint requirements for older children are less strong.

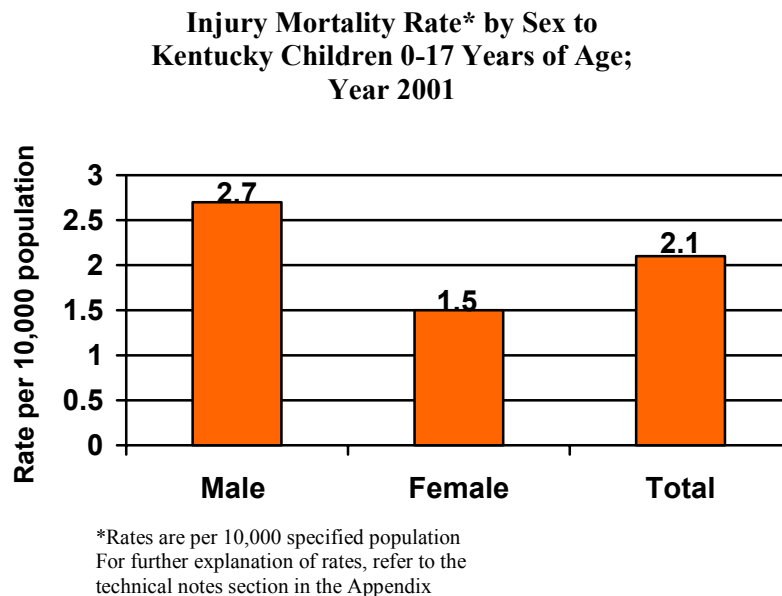
Injury related fatalities continue to remain a leading cause of death for children of all ages in Kentucky accounting for 35% of child deaths in 2001. Children less than one year of age had the highest death rate due to injuries (5.5/10,000) and children aged 5-9 had the lowest rate (1.1/10,000) [Figure 17.]. The overall rate of death for children birth to 17 due to injuries was 2.1/10,000 population with males having a rate of death almost twice that of females (Figure 18.).

Figure 17.





**Figure 18.**



### **Unintentional Injuries**

There are two main types of injury related fatalities; unintentional and intentional. Of the total injury child fatalities in Kentucky, 88% were unintentional in nature with transportation related incidents contributing the most deaths. The leading causes of unintentional injury child deaths for 2001 included transportation, suffocation/strangulation, drowning, and smoke/fire. The remaining unintentional causes included falls, electrical incidents, mechanical forces, medical incidents, and poisoning.

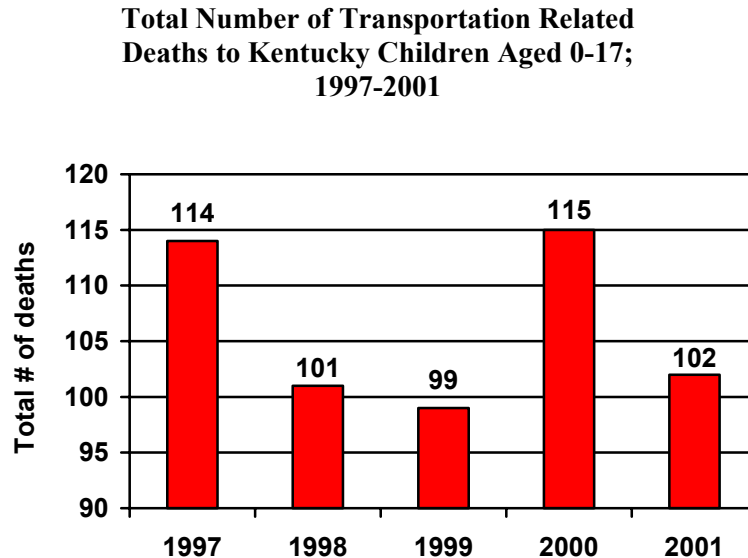
Since the majority of injuries are preventable, it is important to place a strong emphasis on education and awareness of risk factors associated with injuries in order to help increase prevention and reduce incidence.

## Transportation Fatalities

Incidents involving transportation vehicles continue to remain the leading cause of child injury deaths in the Commonwealth. Transportation vehicles may be either motorized or non-motorized. A greater number of child deaths are caused by motorized vehicles including automobiles, trucks, motorcycles, farm equipment, and all terrain vehicles (ATV's). A smaller number of transportation related deaths involve non-motorized vehicles such as skate boards, roller blades, skates, and pedal bicycles.

Transportation related fatalities have not changed dramatically over the past five years in Kentucky. The total number of deaths due to transportation accidents has only declined 10% since 1997 (Figure 19.).

**Figure 19.**

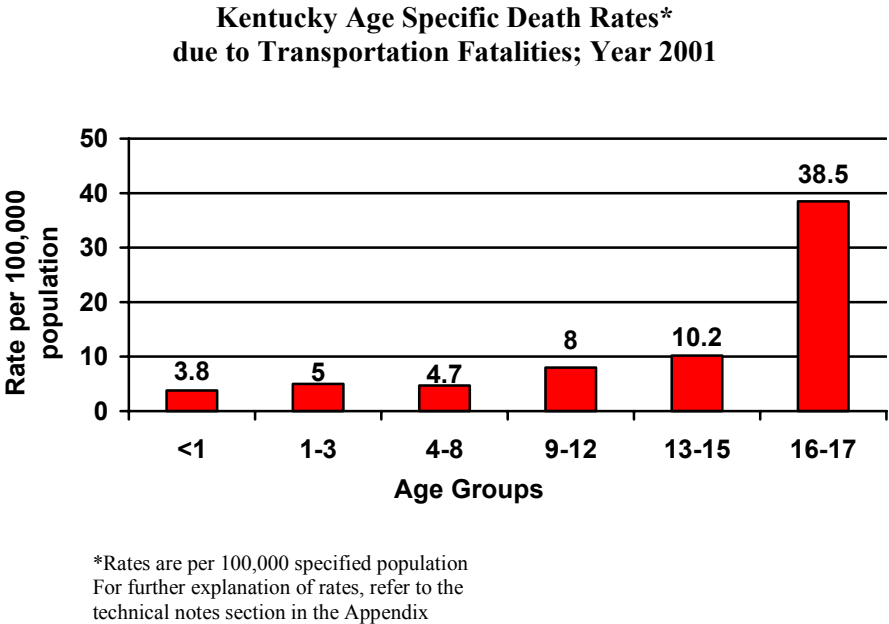


When assessing transportation related deaths, age plays a major role with the majority of the deaths occurring in the teen population and fewer deaths among those less than 12 years of age. Those aged 16-17 had the highest age specific death rate (38.5/100,000) than any other age group (Figure 20.). These data clearly indicate that newly licensed teen drivers are at high risk for transportation injuries and death.

Primary enforcement laws regarding proper use of safety belts for teens and adults is needed in order to help reduce fatal injuries involving transport vehicles. Other legislation, such as the Kentucky graduated drivers licensing program, is also needed to help ensure the

safety of new drivers. The graduated drivers license program has been shown to reduce fatal crashes among 16 year olds by 31% in a 1997-2000 study conducted by researchers at the Kentucky Transportation Center and the Kentucky Injury Prevention and Research Center. Graduated drivers licensing includes restrictions that protect young drivers from hazardous situations while learning to drive including an extended supervised learning period to improve driving skills and decision making.

Figure 20.



The rate of transportation deaths was higher among males than females (Figure 21.) indicating the possibility that males may engage in more risk taking behaviors than females. Of the total transportation related fatalities, 91% were to those of white race while 8.0% were to those of black race (Figure 22.).

Figure 21.

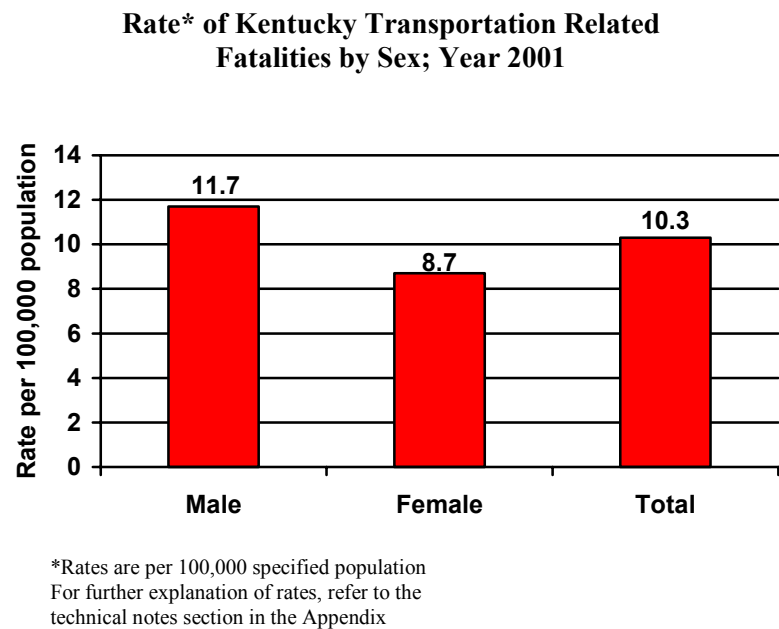
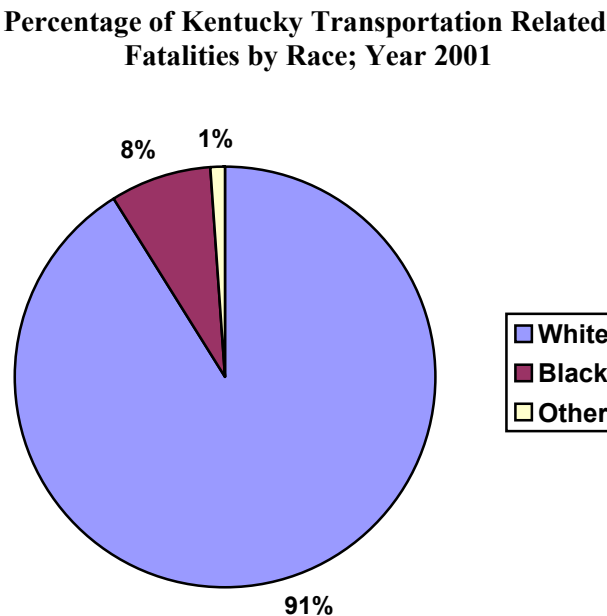


Figure 22.

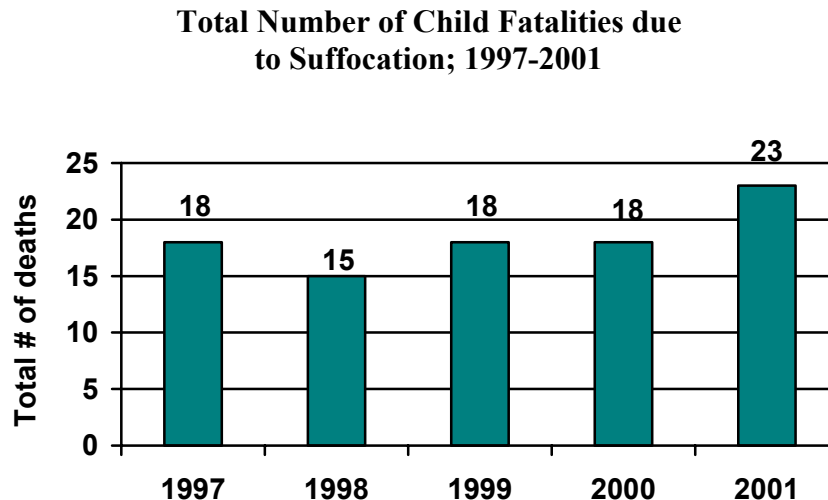


### **Suffocation/Strangulation Fatalities**

Fatalities involving threats to breathing were the second most common unintentional injury deaths in Kentucky for 2001. Child fatalities due to suffocation increased 28% from a total number of 18 in 1997 to 23 in 2001 (Figure 23.). There are many different hazards that can pose a threat to breathing such as suffocation, choking, aspiration, and strangulation. Infants and children under age three are particularly vulnerable to these hazards.

A specific area of concern for infant suffocation is the sleeping environment. Soft bedding, fluffy pillows and blankets, loose-fitting sheets, improper fitting mattresses, and stuffed toys all pose a suffocation risk and should not be utilized in an infant's sleeping environment. A rising concern in the U.S. is the practice of babies sleeping in an adult bed with a parent or caregiver, commonly referred to as co-sleeping. Although this practice is common in other cultures, it is highly controversial in the U.S. Proponents claim there are benefits to co-sleeping such as longer periods of breastfeeding and more restful sleep for the parents. While this may be true, there are dangers associated with the practice including suffocation, falls, getting trapped between the bed and a wall, the head board or foot board, and bed sharers rolling over onto the infant. These dangers should be recognized by care-givers and parents and infants should only be placed in appropriate sleep environments.

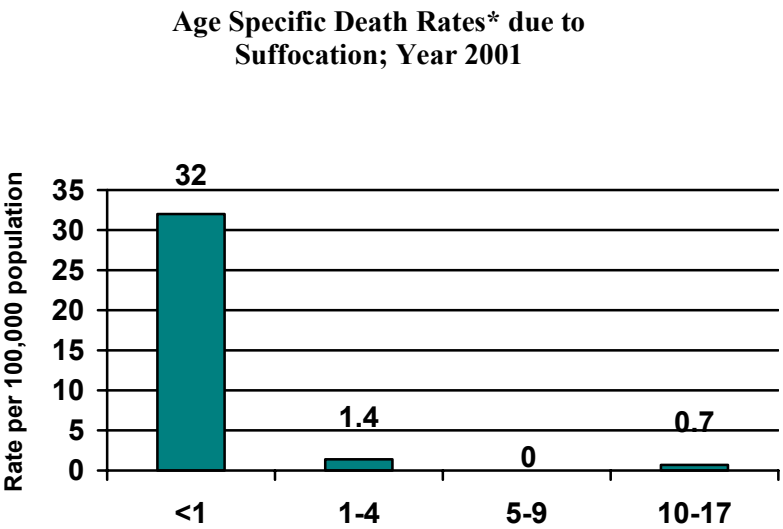
**Figure 23.**



Suffocation fatalities were highest among those less than one year of age with an age specific rate of 32.0/100,000 population (Figure 24.). Infants are at greater risk of suffocation fatalities due to limited physical coordination and cognitive abilities. Extra care should be taken to ensure the safety of an infant’s sleeping environment to help reduce deaths. For example:

- Do not place infants to sleep on the stomach; place on the back instead
- Do not place infants to sleep on soft bedding surfaces such as fluffy pillows, blankets, stuffed animals, couches, waterbeds, or other foam surfaces
- Do not use improper bedding such as loose fitting sheets or blankets; ensure infants crib has proper fitting mattresses and bed linens
- Do not place infant to sleep in an adult bed
- Remove any extra blankets or toys from infants bed before placing the infant in bed

Figure 24.

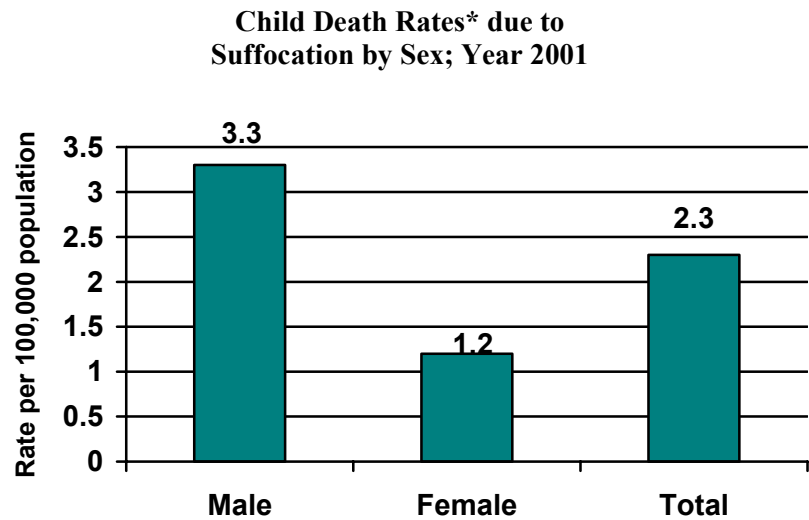


\*Rates are per 100,000 specified population  
For further explanation of rates, refer to the Technical Notes section in the Appendix



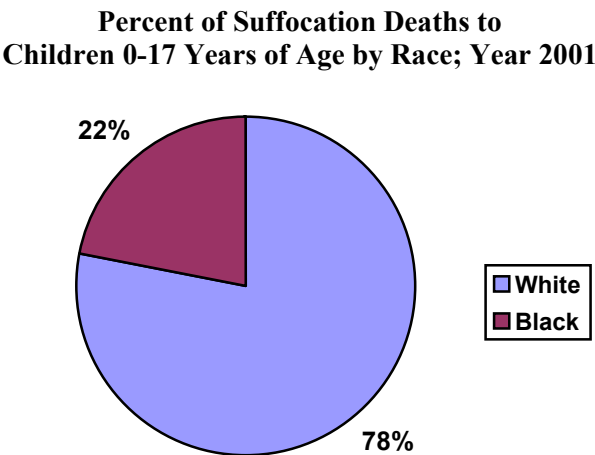
Males had a higher rate of suffocation deaths than females (Figure 25.) and a greater percentage of whites died from suffocation than blacks (Figure 26.).

Figure 25.



\*Rates are per 100,000 specified population  
For further explanation of rates, refer to the  
Technical Notes section of the Appendix

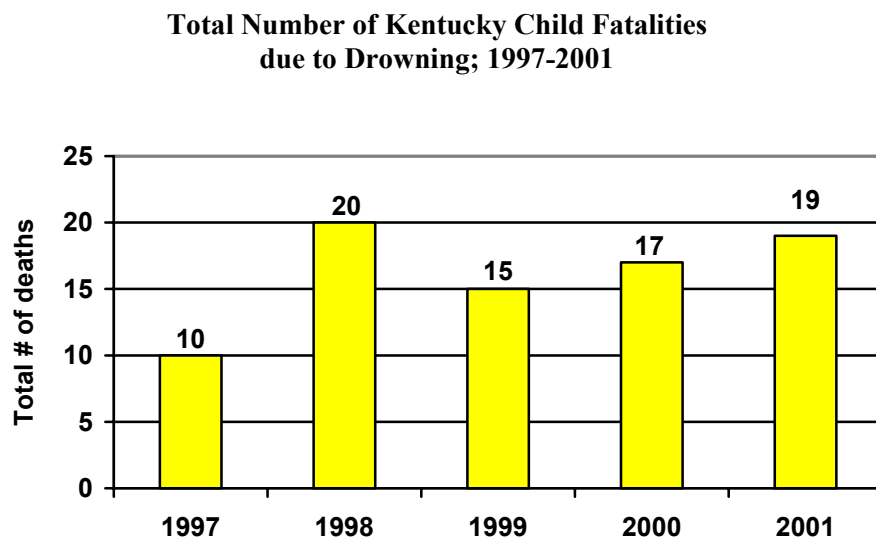
Figure 26.



## Drowning Fatalities

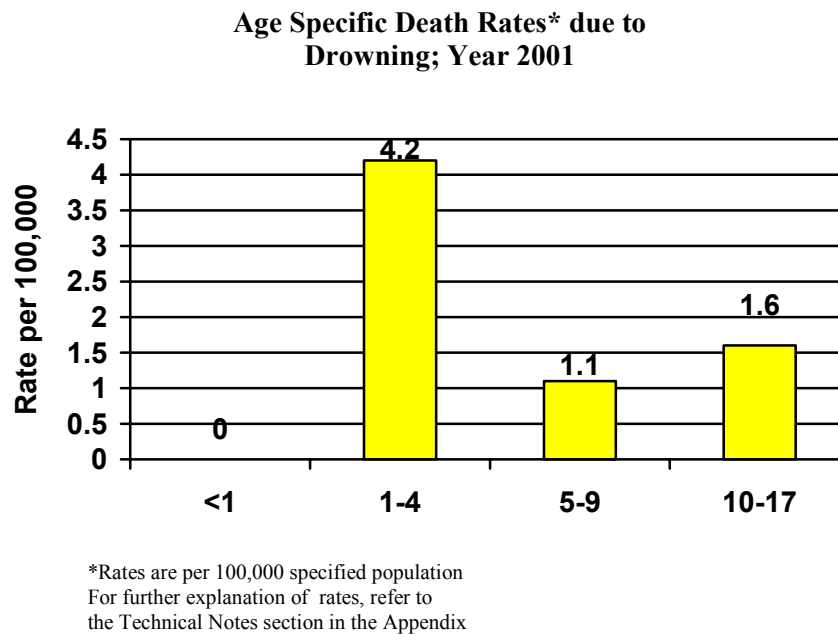
Drowning is the second leading cause of injury-related death for children aged 1-14 in the United States. Nationally, there were a total of 943 deaths due to drowning in children less than 15 in year 2000.<sup>7</sup> Lack of adult supervision, inability to swim, and alcohol intoxication are only a few of the contributing factors leading to this preventable fatality. Deaths due to drowning were the third leading cause of unintentional injury deaths in Kentucky for 2001. Drowning fatalities increased 90% from 1997-2001 (Figure 27.) emphasizing the need for proper public education on water safety.

Figure 27.



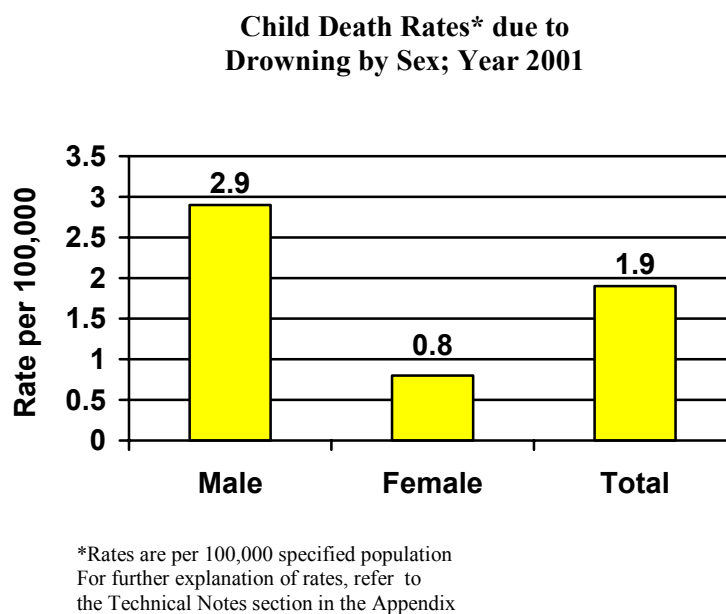
Age is a major contributing factor related to fatal drowning. Typically, the very young (<5) and the teen-age group have the most occurrences of drowning deaths. In Kentucky, the age group with the highest rate of drowning fatalities were the 1-4 year olds with a rate of 4.2/100,000 population (Figure 28.) indicating the need for proper adult supervision at all times a young child is around a water source. The age group with the second highest death rate due to drowning was the 10-17 year olds possibly indicating that adolescents and teenagers engage in risk-taking behaviors ignoring water safety issues.

Figure 28.



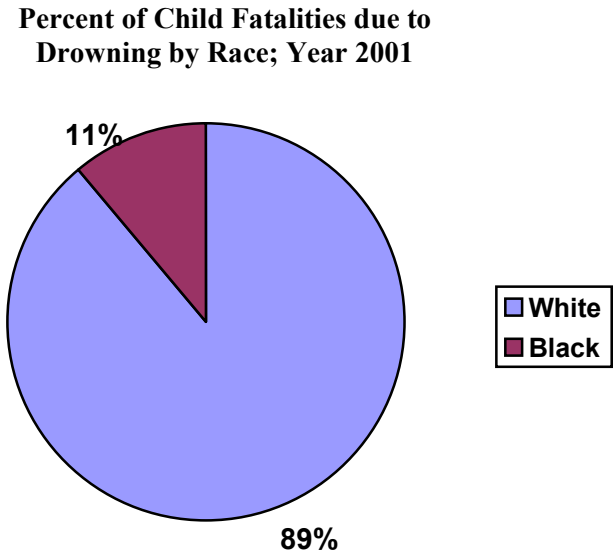
The rate of drowning was higher among males than females with males having a rate of death 3.6 times that of females (Figure 29.). This may indicate that males tend to be more “risk takers” than females thus placing themselves at risk of death due to injuries.

Figure 29.



The majority of drowning fatalities (89%) were to those children of white race with 11% occurring among those of black race (Figure 30.).

**Figure 30.**



The most common source of water for fatal drowning in Kentucky included open sources of water such as rivers, lakes, and in-ground swimming pools and ponds (see Table 2.). The majority of fatal drowning occurred in other sources of open water (i.e. in-ground ponds, decorative/landscape ponds, frozen ponds, and water reservoirs) followed by lake/river and swimming pools. There were no fatal drownings occurring in the bathtub for year 2001.

**Table 2.**

**Total Number of Kentucky Resident Deaths due to Drowning by Source of Water; 2001**

Source of Water	Total # of Drownings
Other open water source	8
Lake/River	6
Swimming Pool	5
<b>State Total</b>	<b>19</b>

The importance of proper adult supervision of children around water sources cannot be stressed enough. Adults must supervise small children at all times in and around water sources to help prevent fatal drowning accidents from occurring. In 2001, 26% of the drowning deaths that occurred in Kentucky were attributed to a lack of adult supervision and or neglect<sup>8</sup>. Proper prevention measures and water safety rules should be followed at all times in order to prevent fatal drowning from occurring among Kentucky's children.

## **Prevention Measures:**

The National Center for Injury Prevention and Control addressed the issue of childhood drowning with the following recommendations:

You can greatly reduce the chances of you or your children becoming drowning or near-drowning victims by following a few simple safety tips:

- Whenever young children are swimming, playing, or bathing in water, make sure an adult is **constantly** watching them. By definition this means that the supervising adult should not read, play cards, talk on the phone, mow the lawn, or do any other distracting activity while watching children.
- Never swim alone or in unsupervised places. Teach children to always swim with a buddy.
- Keep small children away from buckets containing liquid: 5-gallon industrial containers are a particular danger. Be sure to empty buckets when household chores are done.
- Never drink alcohol during or just before swimming, boating, or water skiing. Never drink alcohol while supervising children. Teach teenagers about the danger of drinking alcohol and swimming, boating, or water skiing.
- To prevent choking, never chew gum or eat while swimming, diving, or playing in water.
- Learn to swim. Enroll yourself and/or your children aged 4 and older in swimming classes. Swimming classes are not recommended for children under age 4.

- Learn CPR (cardio-pulmonary resuscitation). This is particularly important for pool owners and individuals who regularly participate in water recreation.
- **Do NOT use** air-filled swimming aids (such as "water wings") in place of life jackets or life preservers with children. These can give parents and children a false sense of security and increase the risk of drowning.
- Check the water depth before entering. The American Red Cross recommends 9 feet as a minimum depth for diving or jumping.

#### **If you have a swimming pool at your home:**

- Install a four-sided, isolation pool-fence with self-closing and self-latching gates around the pool. The fence should be at least 4 feet tall and completely separate the pool from the house and play area of the yard.
- Prevent children from having direct access to a swimming pool.
- Install a telephone near the pool. Know how to contact local emergency medical services. Post the emergency number, 911, in an easy-to-see place.
- Learn CPR.

#### **Additional Tips for Open Water**

- Know the local weather conditions and forecast before swimming or boating. Thunderstorms and strong winds can be extremely dangerous to swimmers and boaters.
- Restrict activities to designated swimming areas, which are usually marked by buoys.
- Be cautious, even with lifeguards present.
- Use U.S. Coast Guard-approved personal flotation devices (life jackets) when boating, regardless of distance to be traveled, size of boat, or swimming ability of boaters.
- Remember that open water usually has limited visibility, and conditions can sometimes change from hour to hour. Currents are often unpredictable -- they can move rapidly and quickly change direction. A strong water current can carry even expert swimmers far from shore.
- Watch for dangerous waves and signs of rip currents -- water that is discolored, unusually choppy, foamy, or filled with debris.
- If you are caught in a rip current, swim parallel to the shore. Once you are out of the current, swim toward the shore.

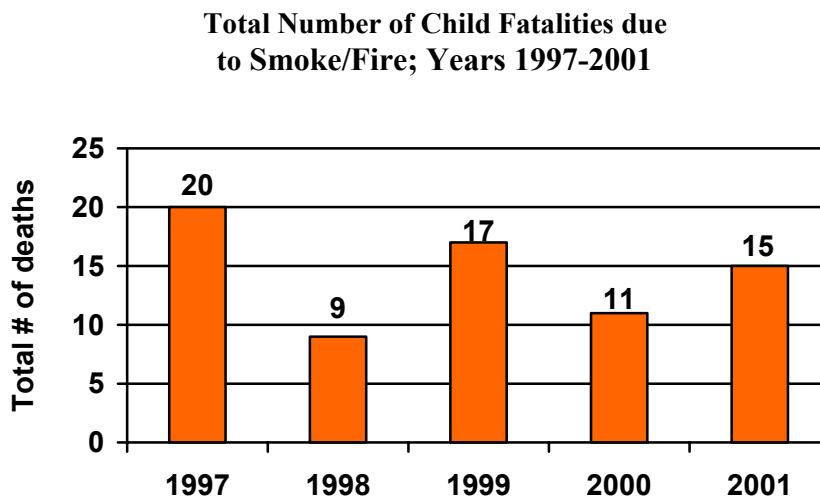
### Smoke/Fire Fatalities

Every year in the U.S., thousands of children are either injured or die in fire related accidents. Nationally, residential fires account for 79% of all fire deaths, and children aged four and under are at greatest risk of fire related deaths<sup>5</sup>. Some children are unaware of the dangers of playing with matches, candles, lighters, or other devices that lead to fire until it is too late. All children should be properly educated in fire safety issues and should never be left unsupervised.

An area of great concern related to fire deaths is either not having a smoke alarm or having a non-working smoke alarm in the home. A survey of Kentucky residents conducted in 1999 revealed that of those surveyed, 32% reported testing their home smoke alarm within the past six months, and 9% reported testing them within the past year<sup>9</sup>. Smoke alarms have been proven to be beneficial as well as cost effective. In fact, for every \$1.00 spent on smoke alarms, \$69.00 is saved in fire related costs<sup>5</sup>. All residential homes should contain smoke alarms and routine testing of the alarms should be conducted at least once a year including replacing old batteries with new ones.

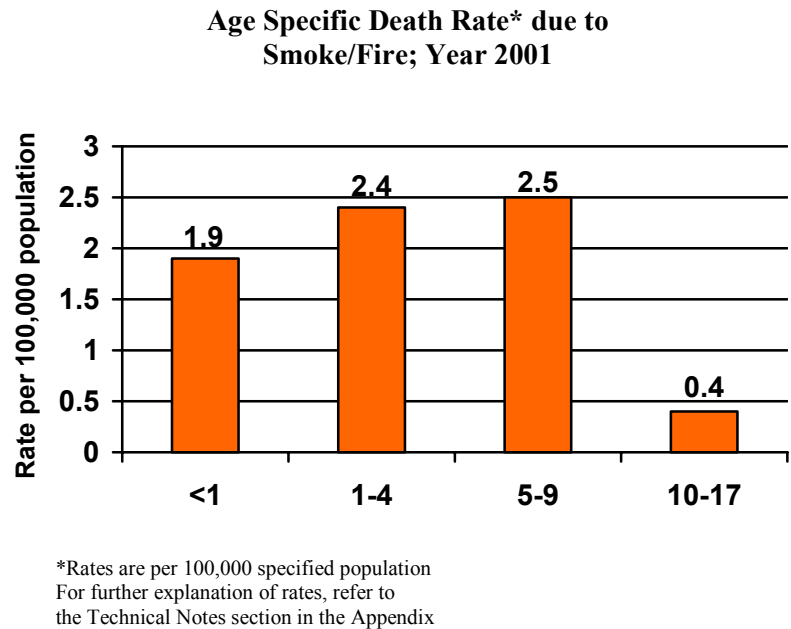
Fire related deaths to children have changed little in the Commonwealth over the past five years. In 2001, there were 15 deaths to children due to smoke and or fire (Figure 31.) representing a 25% decrease since 1997.

Figure 31.



In Kentucky, the age group with the highest death rate due to smoke/fire were those aged 5-9 with a rate of 2.5/100,000 population. The 1-4 age group had the second highest death rate due to smoke/fire (2.4/100,000 population) illustrating the need for proper fire safety education and adult supervision (Figure 32.).

Figure 32.



The smoke/fire death rate was higher among males than females (Figure 33.) demonstrating the fact that boys are more likely than girls to be involved with fires large enough to warrant calling the fire department<sup>10</sup>. Close to three-fourths (73%) of the fire related deaths were to children of white race compared to 20% for children of black race (Figure 34.).



Figure 33.

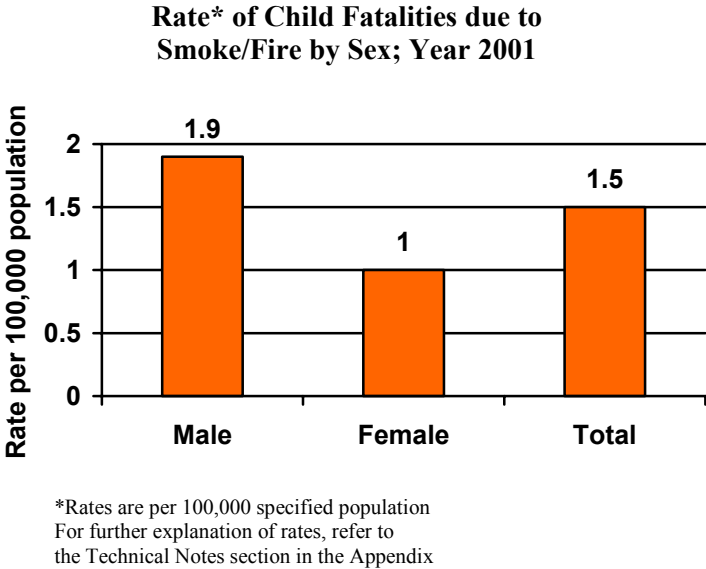
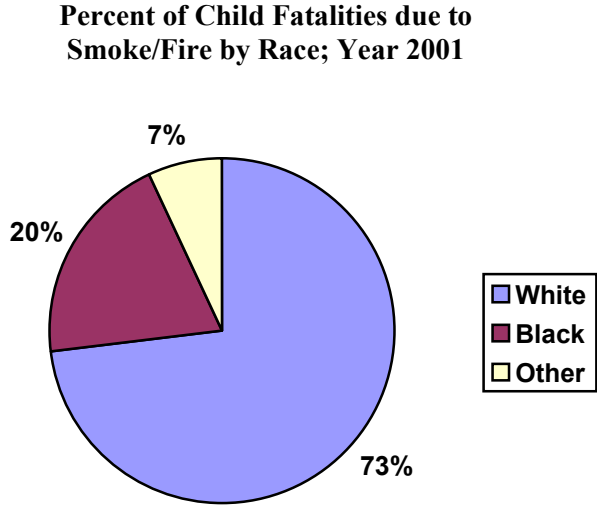


Figure 34.



### **Intentional Injuries**

Intentional injuries are executed with the intent to either inflict forceful injury or death upon another person or to oneself. If the event is inflicted upon another person, it is termed homicide, if it is inflicted upon oneself, it is termed suicide. Of the total injury related child fatalities in Kentucky, 12% were intentional in nature. There were an equal number of homicide and suicide deaths in the Commonwealth during 2001.

### **Homicide Fatalities**

For approximately 30 years, Kentucky has had laws governing the monitoring, reporting and prosecution of homicide deaths related to child abuse or neglect. The process evolved to a multidisciplinary team approach in reviewing information from death scene investigations for use in determining the manner in which abuse or neglect was inflicted and affected a child death. The Kentucky Cabinet for Families and Children, Department for Community Based Services is responsible for implementation of these investigations by a multidisciplinary review system.

The Department for Community Based Services works in conjunction with the Department for Public Health in reporting child abuse or neglect cases and fatalities. The following section, Child Abuse and/or Neglect Fatalities reflects data from the Department for Community Based Services.

## **Child Abuse and/or Neglect Fatalities**

While total homicides in the United States continued to fall in the 1990s, the number of child abuse fatalities has remained unchanged at about 1,100 child deaths per year. Most experts believe that the actual number of fatalities due to abuse and neglect is considerably higher.

There are many forms of physical abuse and neglect that can lead to death. Physical abuse is the infliction of injury by punching, beating, kicking, biting, burning, shaking or otherwise physically harming a child. A major cause of death is inflicted head trauma, including severe shaking.

Most children die from abuse when a caregiver loses patience with the child. The most common precipitating “triggers” are inconsolable crying, bedwetting, fussy eating and disobedient behavior.

Fatalities from neglect include a number of different types. Chronic neglect includes depriving a child of food, clean environments or safe shelter. Deaths can result from malnutrition, failure to thrive, illnesses and /or starvation. Medical neglect includes failure to seek medical care when a child is ill. Many neglect cases result from failure to adequately supervise a child, often for extended periods of time. Negligence on the part of a caregiver can lead to bathtub drowning, suffocations, falls, poisonings and other types of fatal “accidents.”

### **In Kentucky**

The Cabinet for Families and Children, Department for Community Based Services (DCBS) is the agency in Kentucky with the statutory responsibility for receiving and investigating reports of alleged child abuse and neglect. KRS 600.020 (1) defines an abused or neglected child as “a child whose health or welfare is harmed or threatened with harm when his parent, guardian, or other person exercising custodial control or supervision of the child: (a) inflicts or allows to be afflicted upon the child physical injury, by other than accidental means, and (b) does not provide the child with adequate care, supervision, food, clothing, shelter and education or medical care necessary for the child’s well-being.” When an allegation is made that a child’s death may be due to abuse or neglect caused by a caregiver, an investigation is conducted by a social service worker from the Cabinet for Families and Children, usually in conjunction with law enforcement. A finding of “substantiated” or “unsubstantiated” is made in relation to the allegation of abuse or neglect. This is a social work, not a legal determination.

Law enforcement and prosecutors decide if any criminal charges will be brought against the perpetrators. Particular emphasis in the social service investigation is given to the safety and well being of other children in the household.

The following information relates to incidents in which there was a “substantiated” finding of abuse or neglect regarding the death of a child in the year 2001. The statistics in the rest of this report are completed from death certificates and coroner’s reports. The numbers from the Cabinet will differ from those derived from death certificates due to a different manner of categorizing child deaths. For example, the coroner’s report might note that the cause of death was drowning, but the death certificate would categorize it as accidental death; however, an investigation by the DCBS may substantiate neglect in the death because a 9-month-old child was left unsupervised in a tub of water leading to the drowning. Another example may be the death certificate indicates the cause of death was injury from an auto accident however, the parent was driving the car under the influence of drugs or alcohol, therefore, DCBS would substantiate neglect in relation to the death.

**In the year of 2001:**

- There were 33 deaths in which there was a “substantiated” finding of abuse or neglect made by DCBS.
- These involved 31 different incidents ( 2 incidents involved the death of 2 children)
- 13 deaths were substantiated as abuse.
- 20 deaths were substantiated as neglect.
- 20 victims were male
- 13 victims were female
- There was a history of drug or alcohol involvement in 13 of the deaths.
- There was a history of domestic violence in 5 of the deaths
- There had been a prior report of abuse or neglect involving a child in the victim’s family within the past 12 months in 8 of the cases.

National statistics , according to the “2002 Child and Family Services Review Data Profile Annual Report”, indicate that about 75% of deaths due to abuse or neglect involve children under 3 yrs. of age. In 2001 the following is the break down by age and sex in Kentucky. The information in the following tables is from DCBS maintained data.

**ABUSE** (Number = 13)

<b><u>AGE AT DEATH</u></b>	<b><u>MALE</u></b>	<b><u>FEMALE</u></b>	<b><u>Percentage (%)</u></b>
Less than 6 mo.	3	1	31
6 mo. to one year	1	1	15
1-3	4	1	38
4-6	0	0	0
7-10	1	0	8
11-18		1	8
<b><u>46% of deaths under 1 year</u></b>		<b><u>85% of deaths under 3 years</u></b>	

<b><u>CAUSE OF DEATH ABUSE</u></b>	<b><u># OF VICTIMS</u></b>	<b><u>AGES</u></b>
Head trauma (Blunt force or shaken baby)	7	2 mo., 4 mo., 9 mo., 12 mo., 13 mo., 33 mo.; 13 years
Positional asphyxiation due to placement of child	1	6 mo.
Asphyxiated newborns (one put in a bag & then into a hamper; one put in a port-a-potty)	2	newborns
Internal injuries from inflicted trauma	1	30 mo.
Multiple stab wounds	1	30 mo.
Gunshot-mother shot child, then herself	1	10 yrs.

**NEGLECT** (*Number = 20*)

<b>AGE AT DEATH</b>	<b>MALE</b>	<b>FEMALE</b>	<b>Percentage (%)</b>
Less than 6 mo.	5	2	35
6 mo. to one year	0	1	5
1-3	3	2	25
4-6	2	1	15
7-10	1	2	15
11-18		1	5
<b>40% of deaths under 1 year</b>		<b>70 % of deaths under 3 years</b>	

<b>Cause of death: Neglect</b>	<b># of Victims</b>	<b>Ages</b>
<b>Automobile related:</b>		
Passenger in DUI related incident	4	2/6yrs., 10 yrs., 12 yrs.
Unrestrained in a truck	1	2 yrs.
Left in a hot car	1	11 mo.
<b>Positional asphyxiation due to:</b> neglect; e.g. drug/alcohol use or inadequate supervision		
	5	1 mo., 45 days, 2/3 mo., 5 mo.
<b>Lack of supervision:</b> resulting in drowning		
	2	3 yrs., 7 yrs.
<b>Inadequate supervision:</b>		
Fire in apartment	1	18 mo.
Mauled by dog	1	3 yrs.
Hit by car	1	7 yrs.
Choked on milk	1	3 mo.
Electrocuted	1	3 yrs.
<b>Medical neglect:</b>		
	1	4 mo.
<b>Gunshot:-</b> children alone, shot by brother		
	1	6 yrs.

### **Perpetrator Relationship to Victim**

<b>Relationship</b>	<b># of Victims*</b>	<b>Abuse</b>	<b>Neglect</b>	<b>Percentage*</b>
Mother	15	4	11	44
Both Parents	2	0	2	6
Mother & Paramour	5	2	3	15
Father's Paramour	1	1	0	3
Father	5	3	2	15
Other Relative	4	0	4	12
Foster Mother	1	0	1	3
Mother's Paramour	1	1	0	3
Father & Paramour	1		1	3
Babysitter	1	1	0	3
Other Caregiver	1	1	0	3

\*Totals are greater than # of fatalities because in some cases both abuse and neglect was substantiated, e.g. the male caregiver was substantiated for abuse and the female for neglect because she took no action to protect the child.

## **PREVENTION**

What can be done to lessen the number of children who die each year due to abuse and neglect? The Arizona Child Fatality Review Program did an in depth study of child deaths in Arizona for a five year period. Their report entitled "Can Child Deaths be Prevented? The Arizona Child Fatality Review Experience" examined child abuse related deaths. It concluded that "although 61% of child abuse deaths were considered preventable, much of the responsibility for preventing these deaths rests with community members (e.g., relatives, neighbors) who were aware of abuse, but failed to report the family to Child Protective Services (CPS)." Kentucky statutes require that anyone who "has reasonable cause to believe" that a child is abused or neglected is required to make a report. Reports can be made to 1-800-752-6200.

One of the first steps toward preventing abuse/neglect-related deaths is to continue to educate the community about the causes and risk factors that are often exhibited in caregivers.

### **Caregiver General Risk Factors:**

- Depression or inability to cope with stress;
- A problem with drugs or alcohol;
- Being a victim or perpetrator of domestic violence;
- Living near or below the poverty level;
- Having unrealistic expectations for the child's development and behavior;
- Having children under 5 years of age;
- Having children with emotional or health problems;
- Leaving young children with male caregivers who have no emotional attachment to the child; or
- Being very young at the birth of their first child.

### **Prevention Measures:**

- Supporting the development and operation of multidisciplinary child fatality review teams to study abuse related deaths and develop local prevention strategies.
- Educating and supporting the medical community in identifying child abuse/neglect.
- Encouraging collaboration among human service agencies and other community resources that can provide support to families at risk for abuse/neglect.
- Providing opportunities for parent education programs that model appropriate parenting behavior, especially for at risk parents of infants & young children.
- Encouraging public education and awareness programs regarding the signs and risks of abuse/neglect.

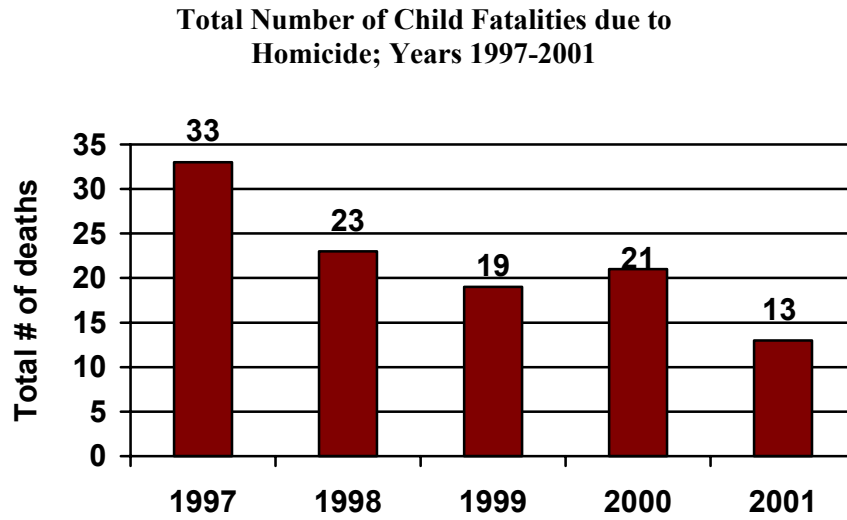
All information and data in the Child Abuse and/or Neglect Fatalities section was compiled by the Department for Community Based Services, contact Nancy Fox.



### Homicide Fatalities

Deaths due to homicide have declined in Kentucky from 1997-2001. There were a total of 13 homicide related deaths to children in 2001 compared to 33 deaths in 1997 (Figure 35.). This represents a 60% decline in the total number of homicide deaths to children over the five year period.

**Figure 35.**



Infants and toddlers are the most vulnerable age group for homicide. For Kentucky, infants had the highest age specific death rate due to homicide (5.6/100,000) with those children aged 1-4 having the second highest (Figure 36.).

Males had a slightly higher rate of homicide deaths than females (Figure 37.) and deaths were more prevalent among those of white race compared to those of black or other races (Figure 38.).

Figure 36.

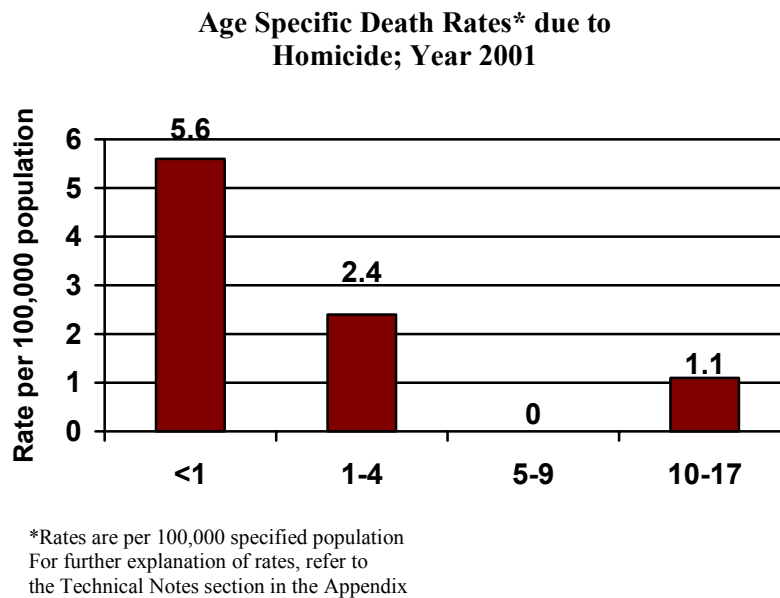
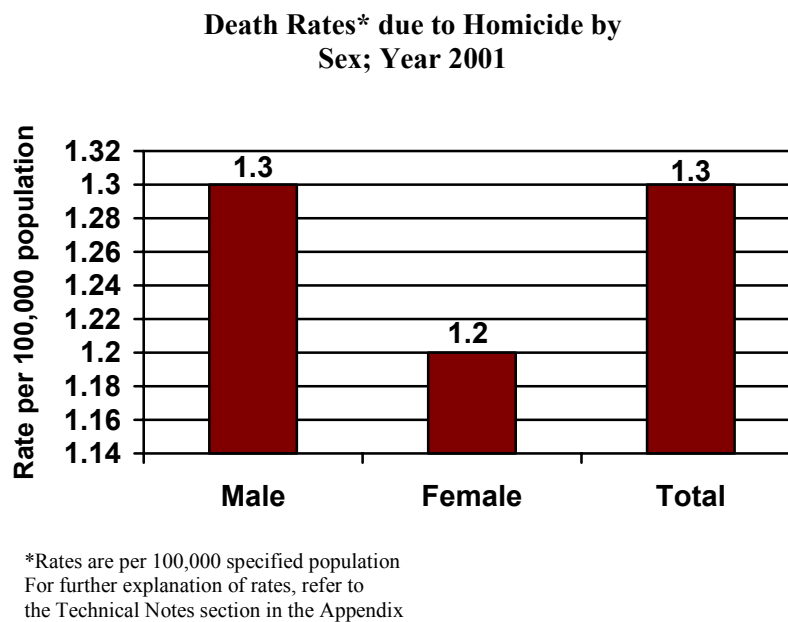
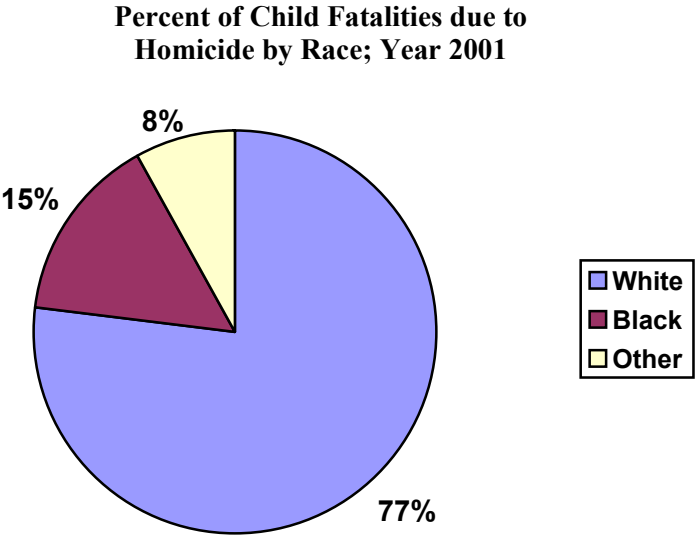


Figure 37.



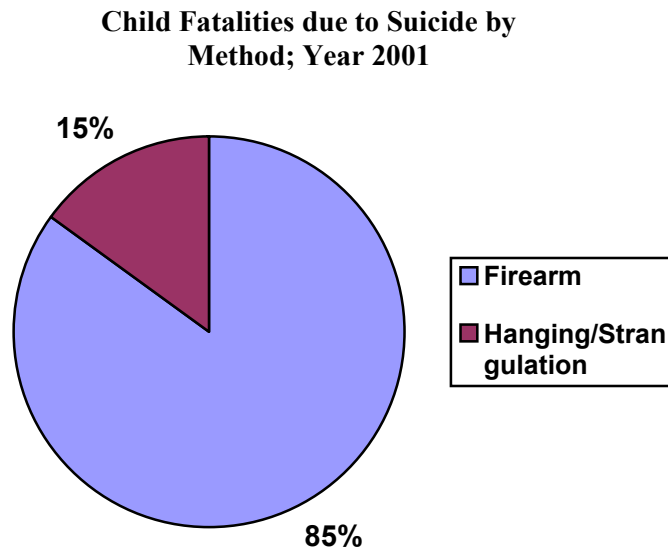
**Figure 38.**



## Suicide Fatalities

Suicide claims the lives of thousands of Americans every year. Nationally, suicide ranked as the 11th leading cause of death in 2001.<sup>7</sup> In Kentucky, there were a total of 13 child suicide deaths in 2001 with the majority (85%) utilizing a firearm to carry out the action (Figure 39.).

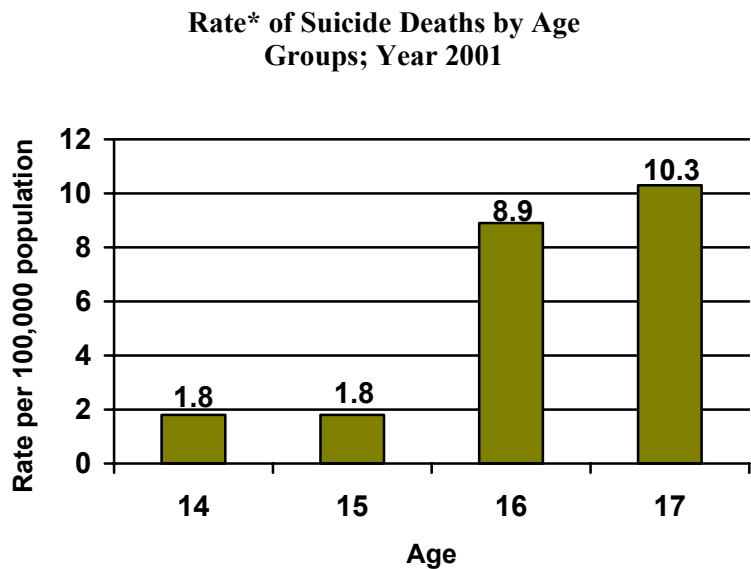
**Figure 39.**



Suicide and attempted suicide among youth is a very complex issue that deals with an individual's thoughts, feelings, attitudes, and behavior. Data from the 2001 National Youth Risk Behavior Survey indicated that of those youth surveyed in grades 9-12, 28.3% reported feeling sad or hopeless during the 12 months preceding the survey, and 8.8% reported they had attempted suicide in the 12 months prior to the survey. Data specific for Kentucky showed that of those surveyed in grades 9-12, 26.8% reported feeling sad or hopeless during the 12 months preceding the survey, and 7.6% reported attempting suicide in the 12 months prior to the survey.<sup>11</sup>

All suicide deaths in 2001 occurred in the teen population ranging from 14-17 years old. The age group with the highest age specific death rate for suicide was the 17 year olds with a rate of 10.3/100,000 population (Figure 40.). This age group had a rate six times that of the 14 year olds indicating that older teens are more likely to successfully complete suicide than younger teens.

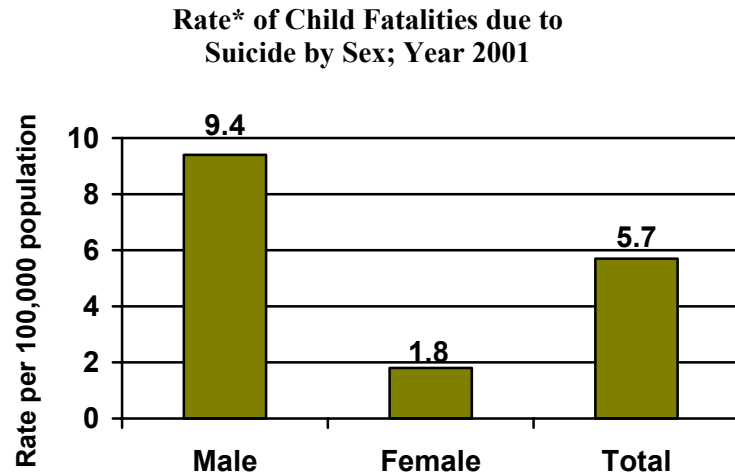
Figure 40.



\*Rates are per 100,000 specified population  
For further explanation of rates, refer to  
the Technical Notes section in the Appendix

Research previously conducted by the National Strategy for Suicide Prevention indicated that the male teen population was at a higher risk for suicide than female teens. In Kentucky, males had a rate of suicide deaths five times that of females (Figure 41.). Clearly, prevention efforts should be targeted to all teens but with special attention to the male teen population.

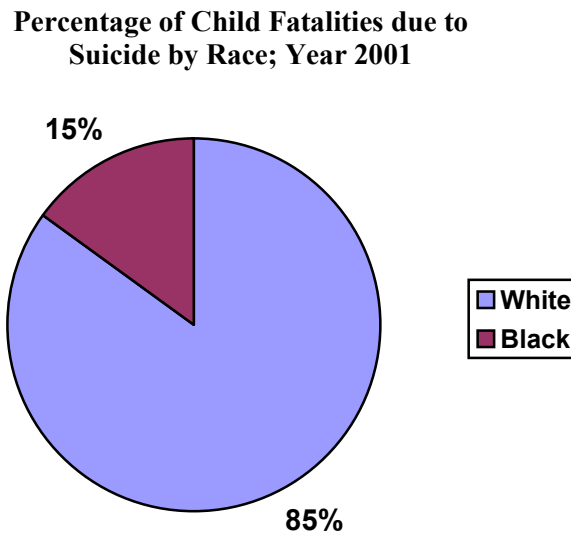
Figure 41.



\*Rates are per 100,000 specified population  
For further explanation of rates, refer to  
the Technical Notes section in the Appendix

Of the total child suicide deaths in 2001, 85% were of white race compared to 15% of black race (Figure 42.). Special attention should be given to the ethnic differences that may exist regarding suicide risks and behaviors when implementing prevention efforts.

**Figure 42.**



It is important to be aware of the warning signs of suicide and where to seek help when a crisis arises. The following is not an all-inclusive list but represents the more “common” behaviors exhibited by individuals contemplating suicide.

**Warning Signs:**

Parents and adults who work with teens need to be able to recognize the danger signals associated with severe depression and ideation of suicide:

- Noticeable change in eating and sleeping habits
- Decline in school performance
- Violent or rebellious behavior
- Drug and/or alcohol abuse
- Unusual neglect of personal appearance
- Difficulty in concentration
- Radical personality changes
- Withdrawal from friends, family and regular activities
- Sudden, forced cheerfulness after a period of depression
- Verbal comments such as “I won’t be a problem much longer...”

**Prevention Measures:**

Currently there is no definitive measure to predict suicide or suicidal behavior. Researchers have identified factors that place individuals at higher risk for suicide, but very few persons with these risk factors will actually commit suicide. Risk factors may or may not include mental illness, substance abuse, previous attempts at suicide, family history of suicide, history of sexual abuse, and impulsive or aggressive tendencies. Suicide is a relatively rare event and it is therefore difficult to predict which persons with these risk factors will ultimately commit suicide.<sup>12</sup> The following prevention measures should be considered when dealing with an individual contemplating suicide.

- Never agree to keep the discussion of suicide with a teen a secret. Agree to provide help and support in obtaining professional help.
- Talk about suicide in an open manner. Teens need to be given a chance to discuss suicide by voicing their thoughts and opinions. Candid discussion is important particularly when a teen suicide has occurred in a community.
- Let young people know about hotline telephone numbers and crisis intervention services that are accessible locally.
- Risk getting involved. If you suspect suicidal thoughts or behavior, ask the teen directly if he or she is considering suicide. Don't avoid the subject or wait for the teen to come to you.
- Be alert to the teen's feelings. The severity of the problem should be judged from the teen's perception, not by adult standards. If a teen perceives something as a problem, it is a problem for him or her.
- Model healthy behavior and positive problem-solving approaches. Adults can be models for young people by dealing with their own stress in a constructive manner.
- Use television shows, films, newspaper articles and other media as a trigger for a discussion of effective ways to deal with stress and depression.

## **Appendix**

Contained within the Appendix are several articles on various topics written by professionals serving on the State Child Fatality Review Team. These articles reflect the opinions of the authors and any data contained within the articles are from the author's source and are not verified by the Department for Public Health. Other information contained within the Appendix include technical information on rate calculation as well as specific information on how data are collected.



**Article: Abusive Head Trauma**

**Author: Betty Spivack, M.D.,** Forensic Pediatrician, Justice Cabinet, State Medical Examiner's Office

In 2000, as in all years since formation of the Kentucky Child Fatality Review Panel, abusive head trauma has been the most common cause of death in children under age five who were victims of homicide. National statistics tell us that this is not a phenomenon unique to Kentucky.

Abusive head trauma is the cause of 95% of all serious head trauma during infancy, and 80% of all head trauma mortality in the first two years of life. Approximately 25% of victims die from their injuries, and many of the survivors have serious, lifelong disabilities including coma, cerebral palsy, hydrocephalus, blindness, retardation, seizure disorders, and learning disabilities.

The most common acute injuries identified in these children are subdural hematoma, cerebral edema and diffuse retinal hemorrhages. The most common presenting symptoms are seizures, coma, apnea or cardiorespiratory arrest. However, 1/3 of affected children present with milder, less specific symptoms such as lethargy, irritability and vomiting. In children who die of abusive head trauma, neuropathologic examination frequently reveals hypoxic-ischemic brain damage and traumatic axonal injury, which occurs most frequently in the lower brainstem or upper spinal cord. This pattern of injury is not commonly seen in other causes of severe head trauma in childhood, such as motor vehicle crashes or falls from a significant height. Other abusive injuries may be identified concurrently. These include fractures, especially of the ribs and metaphyses (growing ends of the bones), bruises and, on rare occasions, burns. Almost 50% of infants who die of abusive head trauma have fresh or healing fractures at the time of death.

Mechanisms of injury vary, but most frequently involve a combination of shaking and impact, which may be against a hard or soft surface. Evidence of impact is present in 50-75% of all cases, and in up to 90% of fatal cases. However, the presence or distribution of subdural hematomas, retinal hemorrhages and axonal injury are not explainable by impact alone, especially the typically alleged fall from a low height. These injuries indicate a mechanism of rotational acceleration or deceleration, which may be associated with shaking alone or with shaking, followed by a rotational slam against a hard or soft surface, such as a wall or crib mattress.

Many of the children who are victims of abusive head trauma have a history of profound irritability during infancy, a condition also known as colic. In cases where there has been a confession of shaking or other form of abusive head trauma, repeated or prolonged crying is often identified as the event which incited the abuse. Improved counseling about how to cope with the feelings of helplessness and frustration experienced by caretakers of colicky babies, by pediatricians and other health professionals who care for children, may help to prevent this serious form of abuse.

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**Article: Infant Mortality in Kentucky**

**Author: Violanda Grigorescu, MD.,** was employed by the Jefferson County Health Department, Louisville, Kentucky at the time of submitting this article . Dr. Grigorescu, a physician provided her expertise in leading Kentucky's only Fetal and Infant Mortality Review (FIMR), centering its focus in Jefferson County.

Infant mortality is a complex issue that impacts everyone, regardless of circumstances, and it has always been viewed as a good overall indicator of a community's quality of life as well as the health status of its citizens. Several interconnecting factors influence infant mortality such as general community resources, policies, social conditions and quality of life. Each requires our attention as we work to improve the health of women, children and families in our community.

Reducing infant mortality has been and continues to be a long-standing problem addressed by the public health community. If the 2010 Healthy People goal is to decrease infant mortality to 4.5, the Healthy Kentuckians 2010 goal is to decrease it to 6.0. In the same time great efforts are made to eliminate racial disparities, reducing to zero the differences between White and African Americans.

There were four key factors identified in recent decades that suggested the need for a new approach:

1. Current approaches do not readily identify potential gaps in the community where further reductions in infant mortality are possible.
2. Current approaches do not directly lead a community to action-to-target further studies or preventive activities.
3. Current approaches are not simply and easily communicated to community partners and members, inhibiting the community's ability to mobilize to action.
4. There is lack of a standardized, widely accepted approach for a community to examine infant mortality. This requires communities to find or develop their own approach to examine the problem or to use information readily provided to them.

Perinatal Periods Of Risk (PPOR) is a new approach that can offer a new way to monitor and investigate *fetal and infant mortality*. It was developed by Dr. Brian McCarthy from the World Health Organization (WHO) Perinatal Collaborative Center at Centers for Disease Control and Prevention (CDC) and fellow WHO colleagues, to be used in developing countries. CityMatCH in a cooperative agreement with CDC's Division of Reproductive Health to merge science and practice for Urban MCH, having MOD and HRSA as partners, has initiated in 2000 the PPOR practice collaborative, bringing together public health professionals from different cities to learn, understand, use the PPOR approach and to develop a PPOR network group. Louisville and Jefferson County is part of this collaborative being represented by the local Health Department.

The PPOR methodology differs from conventional measures of infant mortality because it is based on a linked birth-death cohort, plus selected fetal records. By including the fetal deaths with infant deaths in a single combined outcome measure, PPOR takes into account all events occurring around the time of birth and provides substantially greater information about adverse pregnancy outcomes.

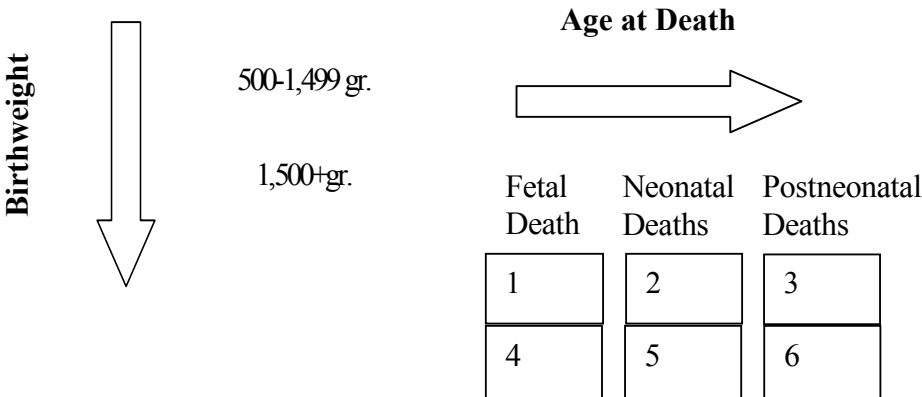
As one of the core components of an ongoing Maternal and Child Health (MCH) surveillance system, PPOR has six key steps:

1. *Engage community partners;*
2. *Map feto-infant mortality;*
3. *Focus on overall rate;*
4. *Examine potential opportunity gaps;*
5. *Target further efforts;*
6. *Mobilize for sustainable systems change.*

This article, focused on the second step that it is very characteristic for the PPOR approach, wants to give an example of integrating PPOR in the existing MCH projects/strategies.

PPOR Step 2: The second PPOR step is to “map” feto-infant mortality. This map can provide a simple framework upon which to build greater prevention efforts. The map’s framework includes two dimensions: age at death and weight at delivery (birth weight).

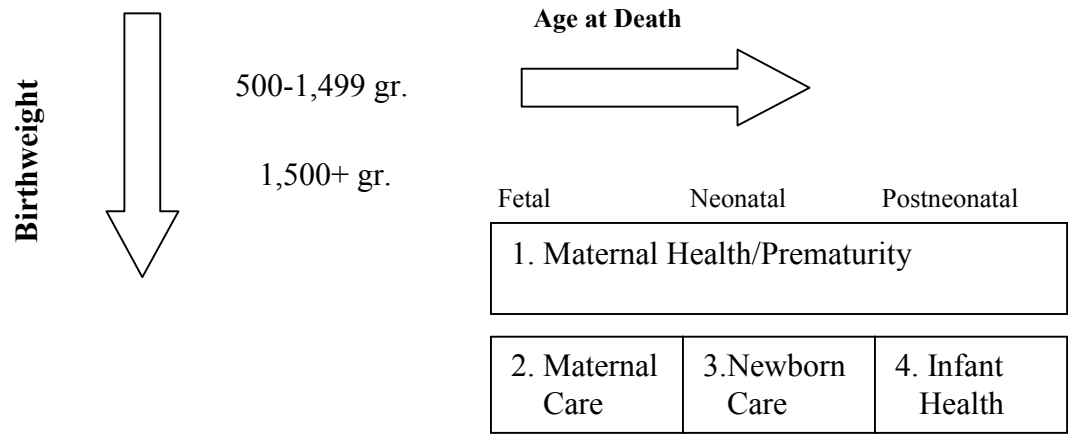
Combining age at death and birth weight yields the two-dimensional map of feto-infant mortality. The three categories for age at death are: (1) fetal deaths, (2) neonatal deaths (first month of life), and (3) post-neonatal deaths (remainder of the first year). These time periods are hypothesized to be associated with different causes of death. Birth weight can be divided into two major birth weight categories: those less than 1,500 grams (very low birth weight--VLBW) and those 1,500 grams or more (higher birth weight--HBW) based on the findings that much of the mortality impact of low birth weight can be captured in the VLBW group and it is similar for those 1,500 grams and over. Combining these two dimensions provides a 2 by 3 matrix of 6 cells.



It is important to note that this matrix uses two clearly defined cutoffs. First, fetal deaths are limited to fetal deaths with gestational ages of 24 weeks or more. Second, fetal deaths and live births are limited to birth weights of 500 grams or more. These are necessary because there are large reporting differences in vital records across U.S. cities for events below these two cutoffs. For an added benefit, these cutoffs generally limit pregnancy events to those that are physically viable, assuming no underlying congenital defect or medical condition.

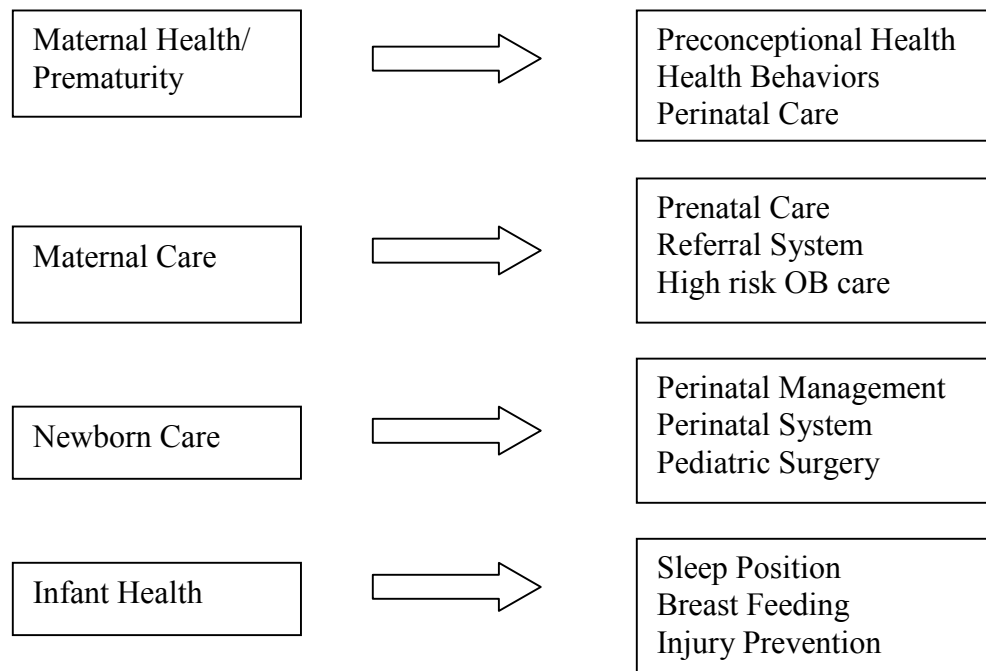
The PPOR approach clusters these six cells into four primary groups. First, the VLBW (500-1499g) fetal, neonatal, and post-neonatal deaths becomes one group. The other three are the higher birth weight (1500+ g) cells form the three remaining groups.

In the PPOR approach, these four groups are given labels that suggest the primary preventive direction for the deaths for that group. VLBW-related deaths can best be prevented by addressing maternal health issues and by preventing and treating prematurity. For HBW-related deaths the best prevention is by providing maternal care; neonatal deaths, by providing newborn care; and postneonatal deaths, by improving infant health.



These labels were designed to suggest preventive action <sup>13,14</sup>:

- (1) For Maternal Health and Prematurity (VLBW deaths) it is hypothesized that prevention may need to focus on preconceptional health, unintended pregnancy, smoking, drug abuse, and specialized perinatal care.
- (2) For Maternal Care (Stillbirths) it is hypothesized that prevention may need to focus on early continuous prenatal care, referral of high-risk pregnancies and good medical management of diabetes, seizures, postmaturity or other medical problems.
- (3) For Newborn Care (Newborn Deaths) it is hypothesized that prevention may need to focus on advanced neonatal care and treatment of congenital anomalies.
- (4) For Infant Health (Infant deaths) it is hypothesized that communities may need to focus on SIDS prevention activities such as sleep position education or breast-feeding promotion, access to medical homes and injury prevention.



Further investigations or prevention efforts based on identified gaps are necessary. This called the PPOR Phase II investigations and activities. For example, further studies should focus on why rates are highest for maternal health/ prematurity. This could include conducting epidemiological studies or conducting fetal and infant death reviews (FIMR). In addition, further examination could include a review of current prevention efforts targeted at one of the four fetoinfant mortality groups, in an attempt to determine gaps and needed prevention strategies and services. Through this step, community prevention efforts can be efficiently and effectively targeted at specific components or populations.

To assist with further studies, the Work Group has developed study protocols to specifically investigate elevated maternal health/prematurity and infant health mortality rates. For maternal health/prematurity rates, the protocol focuses on whether the difference is due to birthweight distribution or to birth weight-specific mortality rates. This partition can be used to further focus studies to examine either the prevalence and impact of risk factors causing high VLBW/prematurity or the aspects of the perinatal care system that are responsible for higher birth weight-specific infant mortality rates.

In terms of infant health, the first step is to investigate underlying cause-of-death. Each cause-of-death category has its own specific set of risk or preventive factors. Therefore, further investigation can focus on a specific underlying cause and its related factors. For SIDS, the factors might be the prevalence of infants sleeping on their belly or of infants in a smoking environment.

### **Louisville and Jefferson County data**

The PPOR analysis of the fetal and infant deaths that occurred in Louisville and Jefferson County in the three years from 1997 to 1999 showed that there were 264 deaths (fetal and infant deaths) and 29,048 births (live births and fetal deaths) with an overall rate of fetal and infant mortality of 9.09/1,000 live births & fetal deaths. The rates for each of the four PPOR groups: 1) VLBW death rate (Maternal Health/Prematurity) = 2.93; 2) Stillbirths rate (Maternal Care) = 2.55; 3) Neonatal death rate (Newborn care) = 1.55; 4) Post-neonatal death rate (Infant Health) = 2.06

When the target population (sample of 264 deaths from 1997 to 1999) was compared to the internal reference group of White, non-Hispanic, 20+ years old and with 13+ years of education, the overall excess rate was 2.85/1,000 live births & fetal deaths. When fetal and infant mortality was divided in the four PPOR groups, the highest excess rate of 1.2/1,000 live births & fetal deaths was found in the VLBW deaths (Maternal Health/Prematurity) group.

An external reference group (national reference group with the same characteristics as the internal group) might be used to hold all communities to the same standard and the ability to reach the same level of mortality. It will also stress the findings when compared to an internal reference or find other excess rates that give more information regarding the excess mortality rates. When the target population (sample of 264 fetal and infant deaths from 1997 to 1999) was compared to the external reference group, the overall excess rate was 3.19. When fetal and infant mortality was divided in the four PPOR groups, the highest excess rate of 1.05/1,000 live births & fetal deaths was found in the Stillbirths (Maternal Care) group.

When the fetal and infant mortality rates were compared by race, the PPOR findings showed that VLBW deaths (Maternal Health/Prematurity) group has the highest gap (2.66/1,000 live births & fetal deaths). Knowing that the Healthy Start area has a high percentage of African American childbearing women, we can assume that this is the main gap in this area. A PPOR analysis for the Healthy Start area was conducted and the groups identified with gaps were Maternal Care and Maternal Health/Prematurity. Unfortunately the data cannot be considered accurate enough because of the poor address information on Vital Statistics that make difficult/inaccurate the geocoding process.

The PPOR Phase 2 analysis demonstrated that the gap is due to birth weight distribution. Therefore, a cohort study design was used to examine the impact of risk factors causing high VLBW/prematurity. The analysis performed so far (prevalence, relative risk and attributable risk percent were calculated) led us to one main recommendation:

- to target the prevention strategies to perinatal health (preconceptional, during pregnancy and interconceptional) and not just to prenatal health (during pregnancy).

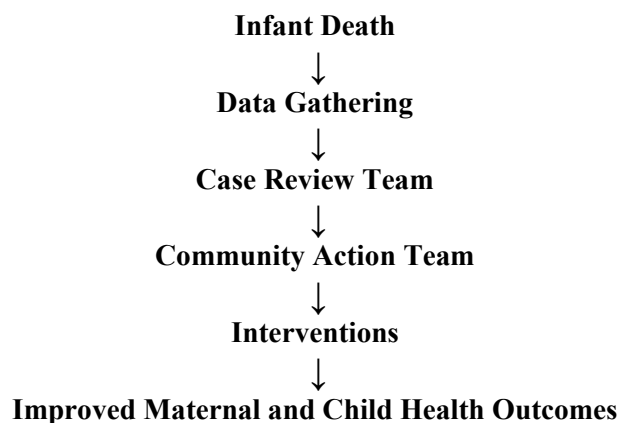
PPOR data were also used to target the **Fetal and Infant Mortality Review (FIMR)** efforts and thus to analyze only those deaths from the groups identified as having gaps/higher rates when compared to reference groups. Thus a local fetal and infant mortality surveillance was

developed in Louisville & Jefferson County by using both, PPOR and FIMR in a two-steps process. While PPOR as the first step is about data analysis and findings where gaps are, the local FIMR project as the second step in this surveillance provides a vitally important, comprehensive analysis of the complex factors contributing to fetal and infant deaths.

FIMR was implemented in Louisville/Jefferson County with the March of Dimes support and it is a community-based project that analyzes the fetal and infant deaths by collecting data from families who experienced a loss as well as from providers (medical records review). FIMR is very complex and brings more insight to the fetal and infant mortality problems.

Data gathered from the home interviews and medical record abstraction are summarized and presented to the Case Review Team (CRT) that has members from different agencies: local SIDS coalition, local March of Dimes chapter, State Department for Public Health, hospitals, housing authorities, health providers, educators, school system, office of minorities, health insurance companies. The cases are reviewed by a Community Review Team (CRT) and recommendations are made based on the findings to the Community Action team (CAT). The Community Action Team (CAT) has as members policy makers, politicians, administrators and directors of hospitals and other important agencies that have the political will to make changes and to have an impact on our community's health.

#### FIMR Model



There are 15 cases analyzed so far by using the FIMR process. Three CRT meetings were held and one of the main recommendations made to the CAT is:

- the development of a postpartum health care plan for every woman giving birth.

Considering that the behaviors, risk factors exposure and so the birth outcomes vary, the health care plan should be adapted to birth weight as well as to other risks identified by a careful risk assessment conducted postpartum in the home settings.



The PPOR and FIMR recommendation for an interconceptional health care plan was considered when the Healthy Start services were re-shaped and adapted to the new funding cycle models. A risk assessment tool as well as an interconceptional health care plan were developed and began to be implemented in the Healthy Start area with the hope of being expanded to the entire Louisville and Jefferson County area.

This is just an example of a MCH partnership that brings evidence-based findings as well as more insights and understanding of the maternal and child health issues. As a consequence, more targeted and more effective prevention strategies could be developed to improve the health of the women and children living in Louisville and Jefferson County, in the State of Kentucky.

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**Article: Transportation Fatalities Featuring Alternate Terrain Vehicles**

**Author: Susan Pollack, MD.,** is employed by the Kentucky Injury Prevention and Research Center at the University of Kentucky. Dr. Pollack's specialty is pediatric medicine and she works with the center's pediatric and adolescent injury prevention program.

Background: All Terrain Vehicles (ATVs) are vehicles with balloon tires designed for off road use. While designed initially for occupational use, their current use by Kentucky youth is almost entirely recreational, even when it occurs on farms. While numbers of injuries and deaths continue, and alarm grows within the medical community leading to increased parental education about hazards of ATV use by children, sales continue to grow and use mushrooms. The toll continues to mount of families who will never be the same following the death of a child that did not have to occur.

Epidemiology of fatal ATV injuries in Kentucky: Unlike the national picture, it is unclear that the consent decrees were ever accompanied by significant ATV death decreases in Kentucky. Overall, what is notable is the increase in pediatric deaths that has occurred, that they occur throughout the year and that they have occurred in so many different counties of the state.

From 1984 (when record keeping began) through 2001, a total of 91 Kentucky children under age 18 have died of ATV-related injuries. In 1996, the total number of Kentucky ATV deaths (adult and pediatric) surpassed 10 per year regularly. (It had done so in 1987 and 1990 episodically, but other years had fewer than 10 deaths). In 1999 there were 20 total (combined adult and pediatric) Kentucky ATV deaths, in 2000 there were 30, and in 2001 there were 34. Thus in 5 years the toll of ATV fatalities to persons of all ages in Kentucky has tripled.

Since 1984, almost half (57) of Kentucky counties have experienced pediatric ATV deaths. From 1997-99, at least 61 of the 120 Kentucky counties were known to have had children who incurred severe ATV-related injury (Ref- Pollack, Fallat and Stevenson, unpublished EMSC data). Thus ATV injuries are the most ubiquitous injury problem in Kentucky after car crashes, and may have even higher rates than car crashes if one considers the number of people potentially at risk.

From 1997-1999 there was a trend toward increasing severity of All Terrain Vehicle (ATV) related injuries (Ref- Pollack, Fallat and Svenson, unpublished EMSC data). In 1997 there were 4 ATV-related deaths of children under age 18. Deaths to boys ages 13, 15, and 16 occurred in Clinton, Fleming and Carter counties, and a 12 year old girl died in Green County. Deaths occurred in May, July, August and October. In 1998 there were 5 ATV-related deaths of children under age 18. These were all boys ages 9,13 (x2), 15 and 17. The incidents occurred from May through October in Calloway, Martin (x2 in different months), Henry and Muhlenberg Counties. In 1999, there were 5 pediatric deaths involving riders on ATVs: four boys and a girl, ages 13, 14 and 17 (x3) in 5 counties (Lee, Pike, Clay, Hancock, and Monroe) plus an 8 year old girl on a bicycle killed in a collision with an ATV in Powell county. Incidents occurred from mid April through December 31, including July (x2), September and November.

In 2000, there were 11 ATV related pediatric deaths. Ages of those children were 1, 9 (x2), 10,14, 15 (x2) 16 (x2) and 17 (x2). Crashes responsible for these fatalities occurred in the following counties: Breathitt (x2), Floyd, Logan McCracken, McCreary, Washington and Woodford. The incidents occurred during the months of February, March, May, June, July, August, October and December.

In 2001, there were again 11 ATV fatalities to youth under age 18. Ages of those children were 2, 6, 10, 11, 12 (three), 13, 14 (two), and 17. Crashes leading to these deaths occurred in the following counties: Graves, Pendleton, Lewis, Harlan, Greenup (x2 a week apart), Woodford, Todd, Lincoln, Spencer and Casey. The incidents occurred during the months of January, March, April (2), June (2), August (2), September (2), and December. Two deaths were related to crashes involving ATVs and other vehicles (a go-cart and a bobcat).

Prevention Strategies: Three simple prevention strategies would make an immediate impact on ATV death: stay off paved roads, no extra riders, and wear helmets.

All manufacturers clearly state that ATVs are designed and intended for off-road use. Repeal of Kentucky law that permits their use on roads would send a more consistent message to the public, and might stop the increase in on-road crashes and injuries that characterizes ATV injury currently being seen.

Passengers change the center of gravity, make handling more difficult for the driver, and are again not recommended by manufacturers. The hilly terrain of Kentucky is not forgiving of those who are unconvinced about these laws of physics.

Helmets are recommended by ATV manufacturers. Helmets would not prevent every death, since in backwards or forwards roll-overs there are children whose chests are crushed under the 600 pound machines, and there are also cases in which a child with a helmet was thrown into a tree, and died from resulting broken neck. But helmets would prevent some deaths, and they would prevent almost half of the severe, life-changing head injuries from which

youth survive but may not ever recover. Yet only 5/131 severely injured children in Kentucky during 1997-99 were reported to be wearing a helmet (Pollack, Fallat and Stevenson, unpublished EMSC data).

Because ATVs are motor vehicles and not toys, the American Academy of Pediatrics and the American Academy of Orthopedic Surgeons recommend that children under age 16 not drive or ride them at all. Repeatedly, the staff of Kentucky Pediatric Intensive Care Units report hearing parents say “we didn’t know they were dangerous”. It is important that physicians, nurses, health educators, other health personnel and the media continue to educate parents about the sizeable risks involved. The inherent risks of children driving machines often sized for adults is augmented by the unforgiving terrain of Kentucky.

Longer term prevention strategies- education not to use, collaboration with other states including West Virginia, Tennessee, Ohio, Utah, and Arkansas who are working on the same problem

**Article: Smoke/Fire Fatalities****Author: Bruce Morgan** is Chief Deputy of the Kentucky Office of the State Fire Marshal.**Child Fire-Related Deaths are Preventable!**

There are nearly half a million fires reported in the United States every year, resulting in the deaths of more than 4,000 Americans and injuries to another 25,000 each year. Of those 4,000 deaths, children account for more than 660, and of that about 300 of those fires can be attributed to children playing with fire. In 2001 in Kentucky we have seen the deaths of 74 persons. Seventeen of these persons were age 14 or younger, accounting for 23 percent of the fire related deaths in 2001. The majority of these occurred in residences which were either not equipped with smoke detectors, or in which smoke detectors were present, but were nonfunctioning.

In the United States the primary areas of origin for fires that result in the injury or deaths of children are in sleeping areas, lounge areas, and kitchen/cooking areas. Of those three areas the leading location is the sleeping area. This is the result of children attempting to hide from adults when playing with fire or even smoking. As in Kentucky, smoking is the leading cause of residential fires. This is increasingly compounded by the increase in the number of very young smokers.

As time has passed we would have hoped to see yearly decreases in all of these figures, although that is not the trend we continue to see. We are observing consistent numbers from year to year with increases in some areas and slight decreases in others. Can we attribute this to a lack of knowledge by the public as to the dangers of fire, or just carelessness by the parties involved? That is a question that is difficult to answer, although the only way that we can combat this ever persistent problem is to educate the public as often and as much as possible.

Having a working smoke detector in your residence more than doubles your chances of survival during a fire. This compounded with following a few other fire safety tips could save your life as well as that of your family...

- Keep matches, lighters, and other ignitable products in secured areas,
- Teach children not to hide from firefighters or other adults,
- Teach children how to escape from fire through home fire drills.

These are only a few of the ways to help protect yourself and your family. Teaching a child how to react in this situation may not only save the child's life, it may very well save your own.

Ref: as found in "Children and Fire in the U. S.: 1994-1997", FEMA/USFA; "Child Fatality Report", Comm. of Ky., Nov. 2001; "Ky. Child Fatality Review System", 3<sup>rd</sup> Annual Report, Jan. 1998 to Dec. 1998, Nov. 1999; "Ky. Child Fatality Review System", 1999 Annual Child Fatality Review Report, April 2001; "Fight Fire with Facts", FEMA/USFA Web Site.

## **Technical Notes & Data Sources**

Data contained within this report are from the Vital Statistics Death Certificate files for Kentucky residents for calendar year 2001 and the 2001 Child Fatality Coroner Report Form database. The data reflects only those deaths occurring to children ages 0-17. Data from the 2001 Vital Statistics Live Birth Certificate files were utilized for denominator data in calculating infant mortality rates. Causes of death are classified based on the International Classification of Diseases 10th revision (ICD-10). Whenever available, rates for the Nation were compared to rates for Kentucky. National rates were obtained from the National Vital Statistics Reports as published by the National Center for Health Statistics and the Centers for Disease Control and Prevention.

Certain limitations exist with death certificate data and should be acknowledged when interpreting results. First, problems exist in the completion of death certificates as well as the accuracy of completed information on the certificate. Physician interpretation of mortality causal events may differ which could lead to variation in coding the primary cause of death. Also, determining one specific underlying cause of death among decedents with multiple chronic diseases can become problematic since the etiologic sequence of diseases may be unclear, and one single disease may not adequately describe the cause of death. Second, data reported in this publication are from the primary cause of death field only and do not include supplemental causes of death. This could lead to under-reporting of certain causes of death. For example, an infant with a congenital heart defect that is born pre-term may have listed prematurity as the primary cause of death on the certificate with congenital anomalies listed as a contributing cause of death; since this report is based only on the primary cause of death, this infant would be counted in the prematurity deaths but not in the congenital anomalies deaths. Therefore, reporting based solely on the primary cause of death can lead to under-reporting of certain causes.

### **Calculation of Rates:**

Often times rates are used to relate the number of cases of a disease or outcome to the size of the source population in which they occurred. A rate is defined as a ratio in which there is a distinct relationship between the numerator and denominator, and some measure of time is included as part of the denominator. One example of a rate would be the number of newly diagnosed cases of breast cancer per 100,000 women during a given year.

Infant mortality rates are commonly used to measure the risk of dying during the first year of life. These rates are calculated by dividing the number of infant deaths in a calendar year for a given area by the number of live births registered for the same period and area and are presented as rates per 1,000 live births. In contrast to infant mortality rates based on live births, infant death rates are based on the estimated population under one year of age. Infant death rates presented in this report as age specific death rates are calculated by dividing the number of infant deaths by the 2000 Census Population Estimates of persons under one year of age residing in Kentucky. These rates are presented as rates per either 10,000 or 100,000 population in this age group. Due to differences in the denominators, infant death rates may differ from infant mortality rates.

With the exception of infant mortality rates, rates presented within this report are on an annual basis per either 10,000 or 100,000 estimated population residing in Kentucky. The U.S. Census Bureau's 2000 Estimated Census Population for Kentucky was utilized for denominator data in calculating death rates. Age specific death rates are calculated by dividing the total number of deaths for a specified age group for a given area and time frame by the total estimated persons within that same age group for the same area and time frame and expressed as a rate per either 10,000 or 100,000 specified population.

Rates were not calculated by race for this publication due to a lack of sufficient denominator data for specified race categories. Causes of death for race categories are presented as a percentage of the total number of deaths per specified cause.

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